

# IRAS

**Emergence: Nature's Mode of Creativity**

Program and Schedule

**The Institute on Religion in an Age of Science**

53rd Annual Star Island Conference, July 29 to August 5, 2006

# CONFERENCE STATEMENT

## *Emergence: Nature's Mode of Creativity*

The concept of emergence provides new ways of thinking about cosmic and biological evolution and challenges some widely held paradigms about the nature of Nature. It also opens up exciting possibilities for reinterpreting many traditional religious views about creation, causality, morality, and the very nature and purpose of human being. IRAS will hold two conferences, in 2006 and 2007, that explore the potential of this concept to revolutionize our worldviews.

Emergent properties arise as a consequence of relationships—for example, the relationships between water molecules that generate a snowflake, the relationships between proteins that generate motility, or the relationships between neurons that generate a memory. They can be reduced to their component parts (snowflakes => water), but they are “something more” or “something else” than their component parts and, hence, novel and innovative. Emergent properties also give rise to yet more emergent properties, generating the vast complexity of our present-day cosmic, biological, ecological, and cultural contexts.

At the 2006 conference, scientists will offer rigorous explanations of what emergence entails (e.g., self-organization and autocatalysis) in language accessible to a general audience, and will describe the centrality of emergence to the dynamics and evolution of the cosmos and planet Earth, the origins of life, and the dynamics and evolution of organisms and ecosystems. In 2007 we will explore how emergence is manifest in the evolution of human beings and in shaping our mental, emotional, linguistic, cultural, artistic, and spiritual modalities.

During both conferences, scientists, theologians, philosophers, clergy, and conferees will consider, in plenary sessions and in numerous workshops, how an understanding of emergent modes of creativity offers us ways to feel at home in the universe, on the planet, and in our daily lives, expanding and even transforming our sense of place, gratitude, reverence, obligation, and the sacred. Clergy and seminarians will meet during the conference to shape conference materials for use in their ministries.

## WELCOME TO STAR ISLAND!

"I'm so glad, I'm so glad, I'm glad, I'm glad, I'm glad." I am glad you are all here, our fullest Island yet, for what I have faith will emerge from this motley collection of wide-eyed new participants and smiling old shoalers, young and old, scientists and religious. Welcome to the first of two conferences on Emergence: Nature's Mode of Creativity. You are already immersed in it!

Why lines from an old blues tune? The blues are "loving someone that don't love you back." It is about what you love, not what loves you back, and Nature, as we all know, can be a bitch. But creativity can also from the dark side come. We love her anyway, and sometimes because of it, especially on this beautiful Island. Look around at the 360-degree horizon, hear the gulls cry, and listen to the surf on the rocks. This is our constant background, this place of solitude and retreat, as we balance the anxiety and ex-stasis of our fascination with cutting-edge and sometimes difficult ideas, the interchanges we will have in lecture rooms and workshops, on the porch and over our meals, and as we enjoy each other's scintillating company, share our talents, or find peace on the rocks. This is *not* nothing but a conference, but something more. Yes. It is that good. We welcome those of you who are new to jump in, the water is fine.

We all engage and disengage, so take what you will, contribute what you can, or enjoy the quiet comfort of friends, a walk on the rocks, or the squeal of children at play. Emergence comes from relationship. What emerges in your hearts, your minds, and your spirits, comes from the boundaries of what is within and without, of island and sea, of self and other, each of which contain pieces of each other; as being, nothingness. There will be plenty of time to talk; there will be plenty of time for quiet, and they can include each other. Enjoy your time on the Island, I am looking forward to meeting you, and to seeing you again.

Yours in anticipation of a great week,

*John Teske*

President of IRAS

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## ORIGIN OF IRAS

In the late 1940s the American Academy of Arts and Sciences organized a Committee on Science and Values to address topics relating contemporary scientific knowledge to fundamental human concerns about life's morals and meanings. The Committee, which included astronomer Harlow Shapley, neurobiologist Hudson Hoagland, geologist Kirtley Fletcher Mather, biologist George Wald, and Ralph Wendell Burhoe, the executive secretary of the Academy, stated that "we believe that ... the survival of human society depends on the reformulation of man's world view and ethics, by grounding them in the revelations of modern science as well as on tradition and intuition."

Several from this committee accepted an invitation to bring their views to an interfaith group at the Coming Great Church Conference on Star Island in the summer of 1954. Later in 1954, the group from the American Academy accepted an invitation of the Coming Great Church Conference to form the Institute on Religion in an Age of Science, a multidisciplinary society that carried forward the work of both predecessor groups. Other leaders involved in the establishment of IRAS included Brand Blanshard, Edwin Prince Booth, Dana McLean Greeley, Donald Szanthy Harrington, Henry Murphy, Lyman Rutledge, and Malcolm Sutherland. Other early members included Ashley Montagu, B.F. Skinner, Theodosius Dobzhansky, and Ian Barbour.

Since 1954 IRAS has held an annual conference on science, values, and religion on Star Island, ten miles off the coast of Portsmouth, New Hampshire. IRAS has also conducted—on its own or in collaboration with other groups—conferences in other places: at universities and theological schools and at meetings of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the American Academy of Religion.

In 1965 IRAS joined with the Meadville Theological School of Lombard College (later Meadville/Lombard Theological School) to establish a journal: *Zygon: Journal of Religion and Science*. The first issue was published in March 1966 under founding editor Ralph Wendell Burhoe, director of the newly formed Center for Advanced Studies in Theology and the Sciences (CASTS) at Meadville/Lombard. In 1979, when Karl Peters succeeded Ralph Burhoe as editor, the editorial offices moved to Rollins College in Florida. IRAS, the Center for Advanced Study in Religion and Science (CASIRAS, successor to CASTS), and Rollins College became joint publishers. In 1989 the editorial offices moved back to Chicago under the editorship of Philip Hefner, director of the newly formed Chicago Center for Religion and Science (renamed the Zygon Center for Religion and Science in 1999). During the past quarter century, *Zygon* has been the chief international voice for the scholarly community in science and religion and has greatly strengthened the influence of the IRAS-CASIRAS approach to relating religion and the sciences.

## PURPOSE OF IRAS

IRAS is a multidisciplinary society of persons who seek to understand and reformulate the theory and practice of religion in the light of contemporary scientific knowledge, and to provide a forum for discussing issues relevant to that goal. The IRAS Constitution states the formal purpose as follows:

- (1) to promote creative efforts leading to the formulation, in the light of contemporary knowledge, of effective doctrines and practices for human welfare;
- (2) to formulate dynamic and positive relationships between the concepts developed by science and the goals and hopes of humanity expressed through religion; and
- (3) to state human values in such universal and valid terms that they may be understood by all peoples, whatever their cultural background or experience, in such a way as to provide a basis for world-wide cooperation.

Various other statements of the goals and purposes of IRAS have also been articulated over the years. For example, there is one in the back of each *Zygon* which says "IRAS is an independent society of scientists, philosophers, religion scholars, theologians, and others who want to understand the role of religion in our dynamic scientific world." The statement that appears as the lead-off paragraph in the Orange Book under "Purpose of IRAS" resulted from some discussions by the council before the 2002 Star Island Conference, and is intended to make it clear IRAS is open to all persons who share these goals, and is not some sort of "elitist" organization.

And most recently, the IRAS Council at its 2003 Mid-Winter Meeting adopted the "Campion Statement," so-called because it originated from discussions at the Campion Center in Massachusetts at the 2002 Mid-Winter Meeting. The Campion Statement reads as follows:

*We at IRAS take the natural world seriously as a primary source of meaning. Our quest is informed and guided by the deepening and evolving understandings fostered by scientific inquiry.*

*From here, our quests for meaning take us in divergent directions. For some, the natural world and its emergent manifestations in human experience and creativity are the focus of exploration. For some, understandings of the natural world are interwoven with understandings inherent in various religious traditions, generating additional paths of exploration and encounter. As a result, we articulate our emerging orientations with many voices, voices that are harmonious in that we share a common sense of place and gratitude.*

*We acknowledge as well a shared set of values and concerns pertaining to peace, justice, dignity, cultural and ecological diversity, and planetary sustainability. Although we may differ and hence debate on how these concerns are best addressed, we are committed to participating in their resolution.*

IRAS is a nonprofit membership organization. Governance is by a volunteer Council whose members are elected from the entire membership. New IRAS members and tax-deductible contributions are always welcome.

## IRAS ON STAR ISLAND

Star Island, first settled by Captain John Smith in the early 1600s, is situated in what was known as the best fishing grounds in the Colonial world. Today one can still see the lobstermen setting their traps. A small museum and island tours allow one to recapture this early human history; and tours of the local flora and fauna, tide walks, and a marine biology lab help one appreciate the local environment.

Because it is ten miles offshore from Portsmouth, New Hampshire, Star Island's temperature is usually ten degrees cooler than on the mainland. It thus became an ideal resort setting for one of the premier late-nineteenth-century hotels on the east coast. Today the hotel, along with several cottages and motel-type units, is a conference center run by the Unitarian-Universalist Association and the United Church of Christ; these two religious organizations have formed the Star Island Corporation. Although IRAS is not affiliated with any particular religious organization, we have enjoyed the hospitality of the Star Island Corporation since our first IRAS conference in 1954.

The nineteenth-century hotel and other facilities provide both the charm and the amenities of that period. Rooms are provided with wash basins and water buckets, and in most cases the toilet is down the hall. The Star Island management and its staff of mostly college students—called Pelicans—are first rate in meeting the various needs of guests from infants to octogenarians. A highlight of the week is the Pelican Talent show—a delightful extra from the hard-working staff. And in recent years IRAS conferees have returned the favor with their own talent show on the final night of the conference.

Star Island and other islands in the Isles of Shoals are excellent examples of the rocky New England coast. There are no roads, no cars, no bicycles, no TVs, and one public phone. (A cellular phone, 603-534-2190, is for emergencies only.) But there are rocks, bushes, grasses, nesting sea gulls, crashing ocean waves, sometimes fog horns, and sometimes crystal-clear night skies to explore through telescopes with some of our professional astronomers (IRAS's first president was astronomer Harlow Shapley). There are opportunities for swimming, rowing, tennis, and ballroom dancing. And the Star Island Book Store and Gift Shop offer books related to the conference theme and other items to remember the week on the island.

Then there are the people who come to IRAS conferences—more than 200, from a variety of academic and professional fields, as well as many well-educated “lay persons.” Many belong to IRAS, which has about 400 members. Others come because they are interested in how liberal religion relates to science and in the particular topic. There is active dialogue in lectures, discussion groups, conversation on the porch overlooking the harbor and on the rocks, and at the social hour before dinner. For those interested, there are opportunities to meditate and worship together in the stone chapel on a high point of the island, at the gazebo, or in the reflective evening candlelight services.

Those who have been coming for a long time to IRAS conferences believe that the natural setting, the island history, and the people provide a unique opportunity for rigorous meaningful dialogue regarding religion and values in relation to contemporary science.

## GENERAL CONFERENCE INFORMATION

**Chapel services** at 9 A.M. each day begin with reflections by George Fisher and Gretchen van Utt and music led by Jane Penfield and Frank Toppa.

**Plenary session lectures and discussion** are scheduled in the *morning* (starting at 10 A.M.) and *evening* (starting at 7:30 P.M.). The speakers (first hour) will develop the theme of the conference as they address different issues and questions from their own disciplines and perspectives. Following a break, a respondent will initiate the discussion session with a reflection on the conference theme from a religious/philosophical perspective, followed by general discussion. The porch bell will be rung (a single stroke) 5 minutes before the beginning of the morning and evening sessions, at 9:55 A.M. and 7:25 P.M. We hope this advance warning enables everyone to reach his or her seat in time to allow a prompt start at 10:00 A.M. and 7:30 P.M. A coffee/hot chocolate/bouillon break is scheduled for 10:55–11:15 each morning. When you hear the bell at the end of this break, please return quickly to the auditorium. Abstracts and biosketches of the speakers and respondents begin on page 9.

The **IRAS seminar**, convened by Michael Cavanaugh, will consider articles by Terry Deacon, already sent as email attachments to conferees, that explore facets of emergence. It will be held on Monday, Tuesday, and Wednesday, 1:40 to 2:40 P.M., in Marshman. Further information may be found beginning on page 18.

**“Free University”** sessions, from 1:40 to 2:40 P.M. each day except Thursday, provide conferees with an opportunity to present their ideas informally and discuss them with others. If you wish to organize such a session, you need to do two things: 1) Check with Nancy Anschuetz at least the day before for a room assignment, and 2) after doing so, give a written note to Jane Bengtson, editor of the *Star Beacon*, describing your offering and its time and location. The announcement will appear in the *Beacon* and will also be posted on the chalkboard.

**Workshops and Discussion Groups** will be offered during the afternoon from 2:50 to 3:50 and 4:00 to 5:00 P.M. Leaders and workshop locations are listed in the schedule on the back page of this program booklet, and workshop descriptions begin on page 20, listed alphabetically by presenter. Other activities such as Meditation, Yoga, and Art are listed beginning on page 30.

**“Happy Hour”** takes place at the end of afternoon activities, from 5:30-6:30 P.M. We gather informally in Newton Center for an hour of libations, snacks, socializing, and, often, music. Contributions to cover the cost are both needed and appreciated.

**Recreation.** Afternoons are also opportunities for recreation: talking, thinking, napping, reading, walking, and playing. Various tours will be announced, including a trip to the Marine Laboratory of the University of New Hampshire on Appledore Island on Tuesday afternoon. (Please sign up at the front desk in advance, as the boat capacity is limited.)

**Swimming.** The hardy (or masochistic) enjoy a polar bear swim in the morning before breakfast. The rest of us can swim throughout the day when the lifeguard is on duty.

**Special meals.** There will be a lobster dinner on *Wednesday* (tickets *must* be purchased at the lobby desk by Monday noon). The traditional IRAS banquet will be on *Friday*.

**Shows.** The Pelican show (organized by the Pelicans, the young people who do all the work to make our stay on Star Island so delightful) will be on Thursday evening after the plenary session, and the IRAS Talent Show is on Friday evening. If you would like to participate in the

Talent Show, especially if you have talent (this is an optional requirement; all hams are welcome), Joan Hunter, the talent show coordinator, will be happy to hear from you.

**Newspaper.** The *Star Beacon* is an IRAS tradition. This conference newspaper appears at breakfast each morning with up-to-date information on the conference and its participants. It provides opportunities for you to respond to lectures and the conference theme, challenge ideas, publish poetry, commentary, and other forms of artistic expression, including humor, all at the discretion of the editor, Jane Bengtson, and as space is available.

**Candlelight services,** arranged by Betty Lau, allow time for quiet reflection at the close of each day in the chapel and environs, and follow the evening-program discussion hour. Each service lasts ~30 minutes. The schedule of presenters is on page 31.

**Star gazing** takes place on clear nights after Candlelight, generally in the open area near Vaughn. Check with Dave Klotz to see if we'll be observing.

**Memorial Service.** A memorial service for IRAS members who have died since last summer is usually held in the Chapel on Friday at 1:40 P.M. Since, to our knowledge, no deaths have occurred during the past year, this time will instead be devoted to a classical music performance; see the *Star Beacon* for details.

The **snack bar**, open until 11 P.M., is a favorite place for congregating and socializing after the candlelight services.

**Dancing** will take place in Newton Front every evening after the candlelight services. Please bring along any favorite CDs you have with you. Genres will include ballroom and rock, as requested by those who come.

An informal **farewell party** will be held on Friday night, an important part of which is to use up any refreshing substances left over from Happy Hour.

**Children** must participate in the children's program unless Nancy Anschuetz receives a signed waiver.

**Discrimination and abuse.** The Star Island Corporation has requested that all conferences formulate guidelines for the prevention of child and adult discrimination and abuse. The IRAS Council has adopted such guidelines. Information about the policy is available from IRAS President, John Teske.

If you have any **questions or suggestions** concerning the conference, please bring them up with Conference Coordinator Nancy Anschuetz, or with Cochairs George Fisher and Ursula Goodenough.



## ARCHI PELAGOS: IRAS CONFERENCE YOUTH PROGRAM

Welcome to Star Island!

Many of you “did come back” and some of you may find yourselves here to share this gift with your children and grandchildren. Certainly it is love that calls me here each summer. And this summer my son Asher is fulfilling his desire to be a Pel after first coming to IRAS 10 years ago. I feel richly blessed to share this time with your children, and I wait in anticipation to see the familiar names on the roster and tell the teachers who will be in their groups. It is such a delight to know we will have this time with them again: to play, create, explore, and especially renew and develop special Star Island friendships. And, of course, there are new staff as well as new young people to share our treasured island with.

We have some traditional activities like scavenger hunts and game day. Then there’s that row to Smuttynose (some adults join us) and oft times we have secret friends and most times we hang out and explore in the marine lab and listen to stories and games with the island historian. We’ll visit our favorite places all over the island. We’ll avoid poison ivy. We’ll create things and imagine things. We’ll try to incorporate some emergence experiences into our morning program and probably our Thursday evening chapel. And who knows what will emerge for our game day activity? We’re hoping to have an opportunity to work with some of the incredible and creative speakers as well. Our program is planned and responsive.

Each parent will receive a handout with the schedule for their child’s group at the introduction meeting following the mandatory Star Island orientation session Saturday afternoon. We hope the bulletin board on the porch is available for our daily announcements and copies of the schedules as well as fun stuff to share. The names and locations of the staff as well as the youth will also be posted there. This year we have 5 groups and 30 youth. Please check the board daily for changes and updates. We will try to get announcements into the morning *Beacon* as well.

In general, we meet each morning at 9:00 A.M. in age specific groups until 12:15 P.M. The seniors meet at morning chapel and again afternoons in Parker. The morning session is structured with both energetic and quiet activities. Afternoons are free and youth are under the supervision of parents and guardians until the social hour (5:15–6:15 P.M.). The one exception is Tuesday afternoon when we offer a program from 4:00–5:15 and parents take back responsibility from 5:15, allowing youth staff to socialize that afternoon.

Several midafternoons we set up craft or game activities on the porch, and these activities are open to all.

A light afternoon snack is offered at 5:00 P.M. on the front porch of the Oceanic or the well house at the bottom of the stairs. This is round-up time for the games and playground time we supervise from 5:15 to 6:15.

Following supper we offer a sunset program from 7:30–8:30 P.M. Please note that the evening plenary session often runs beyond 8:30. Parents resume responsibility for their children at the end of the evening program, so they or their designate need to take over supervision. The following is the planned schedule of evening events as well as special events. Bonfires need to be approved by the fire marshal around supper time, so we hope the gods are with us.

Thank you for bringing your precious ones.

Sandra Woodworth, coordinator

### Archi Pelagos Special Events

Saturday, 7:30–8:30 P.M.	Bonfire with s'mores down on rocks left of summer gazebo (bring flashlight). Sunset can be glorious.
Sunday, 8:30 A.M.	Youth photo (time could change.)
Sunday, 7:30–8:30 P.M.	Theater Improvisation and Games
Monday, 7:30–8:30 P.M.	Bonfire, down on rocks to the left of the summer gazebo (bring flashlight). Story telling and more s'mores.
Tuesday, 4:00–5:15 P.M.	Field games
Tuesday, 7:30–8:30 P.M.	Art Night in Brookfield
Wednesday, 7:30–9:30 P.M.	Dance in Brookfield (those under 12 leave at 8:30).
Thursday, 8:00–8:30 P.M.	Candlelight Chapel Service by youth. (We gather at 7:40 outside Brookfield and begin the candlelight walk at 8:00.) Parents should meet us at the candle station.
Friday, 5:15–6:15 P.M.	Talent Show in Elliot. Snack will be given out on the porch near the stage at 5:00.

Please check the bulletin board on the porch for daily details and notices of changes or additions.

There will be a brief meeting for parents, children, and staff on Saturday in Elliott, immediately after the Star Island Orientation Meeting. All parents with children in the Archi Pelagos program are required to attend. This is your opportunity to meet the staff, find meeting places and ask questions. After introductions we will meet with your children until 6:15. Please make sure you know where to collect your children and be timely so staff can arrive to dinner on time. And please remember that Star Island rules require anyone under 18 to be under the guidance and control of a parent or guardian when not in supervised activities.

## LECTURE ABSTRACTS AND BIOSKETCHES

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### SATURDAY EVENING

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#### INTRODUCTION TO THE CONFERENCE THEME

**Loyal Rue**

#### ABSTRACT

This opening talk will provide a general introduction to themes pertinent to emergence theory, with special focus on the potential of emergence theory to inform our thinking about the meaning of life.

#### BIOSKETCH

Loyal Rue is Professor of Philosophy and Professor of Religion at Luther College, where he has taught for more than thirty years. He has served IRAS in various capacities over the years, including member of council, Vice President for Religion, editor of the IRAS Newsletter, chair of Long-Range Conference Planning Committee, conference cochair, and organizer for various IRAS/AAAS symposia.

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### SUNDAY MORNING

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#### THE CREATIVITY OF THE BIOSPHERE

**Stuart Kauffman**

#### ABSTRACT

Life emerged about 3.8 billion years ago and has burgeoned in diversity and complexity, driven by a poorly understood combination of matter, energy, work, constraint, and information that constitutes the self-propagating organization of process of which Kant spoke more than two centuries ago. This propagating organization in autonomous molecular agents of collective autocatalysis, work cycles, and task closure is seen in cellular reproduction, although we have as yet no theoretical framework to discuss what is directly in front of us.

In the course of the evolution of the biosphere, life has persistently invaded the "adjacent possible" at the molecular, morphological, behavioral, and other levels. Since, at levels of complexity of macromolecules, the history of the universe is vastly nonergodic, the biosphere is on a unique trajectory.

A particularly stunning feature of evolution is the emergence of novel functions via Darwinian preadaptations, such as the lung from the swim bladder of an earlier fish. And a stunning further feature of such preadaptations is that it does not appear to be possible to finitely prestate the possible preadaptations, in part because there appears to be no effective procedure to list all possible selective environments. This means something radical: we cannot prestate the

very variables, or features, that will come into existence in the physical biosphere as it evolves into the adjacent possible.

The biosphere, it seems, is not algorithmic. This "freedom" betokens a vast creativity in the awesome evolution of the biosphere. And that awesomeness in turn must naturally engender respect, wonder, and stewardship. All this is part of a large cultural transformation that just may occur and is of central interest to this gathering.

The proponents of Intelligent Design, the right-wing religious fundamentalists, are deeply driven by a fear that without God, the value system of Western civilization is in danger. In the mid 20<sup>th</sup> century, reductionism reigned supreme and led to Existentialism as a response. It is my belief that we need a new transnational sustaining "myth" that can impart value and respect. It is my further belief that we are coming to see our universe and life as creative, without a directing agency. Meaning emerges with life. If this view becomes widespread, it has the promise to become the sustaining myth we need to sustain in turn an emerging global civilization beset with its concomitant fundamentalist communities.

#### BIOSKETCH

Stuart Kauffman, M.D., is a theoretical biologist with long interests in genetic regulatory networks, the origin of life, evolution and co-evolution, and the character of molecular autonomous agents. He holds founding patents in combinatorial chemistry and high-throughput screening, has founded four companies, three in biotechnology. He authored *The Origins of Order*, *At Home in the Universe*, and *Investigations*, Oxford University Press, 1993, 1995, 2000. He has something over 200 publications, was a MacArthur fellow and is deeply interested in emergence and the creativity at least of the biosphere, if not the universe. He has been on the faculties of the University of Chicago, NIH, University of Pennsylvania, and the Santa Fe Institute and is now Founding Director of the Institute for Biocomplexity and Informatics in Calgary, dedicated to Systems Biology and attempts to achieve differentiation therapy in cancer cells, as well as testing the hypothesis that cell types are attractors and cells are dynamically critical.

#### RESPONDENT

**Tyrone Cashman**

Refer to the workshop listing on page 21.

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SUNDAY EVENING

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ON THE EMERGENCE OF THE CLASSICAL  
FROM THE QUANTUM

**Michael Silberstein**

ABSTRACT

The properties characteristic of classical physics are profoundly different from those taken to be characteristic of quantum physics, such as quantum entanglement and nonlocality. Given that quantum theory is generally taken to be more fundamental than classical physics, the question arises how, if at all, the classical emerges from the quantum. After stressing the apparent differences between quantum and classical systems I will canvass several possible answers to how (if at all) this trick is done and suggest how the various alternatives may be tested. Finally, using examples from condensed matter theory (the science of many-bodied quantum systems), I will provide my own speculation as to how the quantum and the classical are related and suggest how this might shed light on other crucial transitions, such as that of physical systems to living systems.

BIOSKETCH

Michael Silberstein is Associate Professor of Philosophy at Elizabethtown College and an adjunct at the University of Maryland, where he is also a faculty member in the Foundations of Physics Program and a Fellow on the Committee for Philosophy and the Sciences. He is an NEH Fellow who has published and delivered papers on both philosophy of science and philosophy of mind. His primary research interests are philosophy of physics and philosophy of cognitive neuroscience. He is especially interested in how these branches of philosophy bear on more general questions of reduction, emergence, and explanation. His most recent book is *The Blackwell Guide to Philosophy of Science* (co-edited with Peter Machamer), published in 2002, in which he has a chapter on reduction, emergence and explanation. He is currently working on a book titled *Contextual Emergence: on the Relational Nature of Reality*.

RESPONDENT

**Donald Braxton**

Refer to the workshop listing on page 21.

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MONDAY MORNING

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EMERGENCE OF COMPLEX PLANETARY  
STRUCTURES FROM GRAVITY,  
THERMODYNAMICS, AND CHEMISTRY

**Michael Wysession**

ABSTRACT

Earth began as a giant homogeneous ball of dust and rock when the solar system formed, 4.567 billion years ago. Those same atoms now function as part of a com-

plex interconnected system of physical, chemical, geological, and biological processes. Our planet is intricately layered, our rocks are composed of nearly 4000 different mineral types, and our geology is intimately involved with the organic molecules of our biosphere. How did our planet get this way? How did these properties emerge? No, we didn't need to break the 2<sup>nd</sup> law of thermodynamics to do it. The combined effects of strong atomic and electromagnetic forces naturally convert the matter of our planet into minerals. Gravity has created a highly layered planet. And it is actually the 2<sup>nd</sup> law of thermodynamics, the attempt of the Earth to cool down and lose its heat to space, that has allowed the geologic process of plate tectonics to emerge, and this has been responsible for driving the rock and water cycles that have given rise to the great diversity and complexity of this planet. Michael will try to guide us through the process of how basic laws of physics and chemistry can allow a planet like Earth to start with dust and end up as the (mostly) hospitable womb for life that it has been for the past 4 billion years.

BIOSKETCH

Michael Wysession is an Associate Professor at Washington University in the Department of Earth and Planetary Sciences. His research involves using the seismic waves from earthquakes to make three-dimensional images of the interior of the Earth and then interpreting these images in terms of Earth's structure, temperature, composition, and evolution. He got his ScB at Brown and his PhD at Northwestern. He is also very involved with geoscience education. He created the first accurate computer animation of how seismic waves propagate through the earth from an earthquake. He is co-author of the leading graduate-level textbook on seismology, earthquakes, and earth structure. He is lead author of Prentice Hall's 9<sup>th</sup> grade Physical Science textbook and is book writer of four Prentice Hall high school and middle school Earth Science textbooks. He regularly attends National Science Teachers Association conferences and helps train K-12 teachers how to better teach Earth Science. He is also chair of the Education & Outreach committee of the national university earthquake/seismology program, and visited many of the country's major science centers last year as part of a distinguished lectureship.

RESPONDENT

**William Grassie**

William Grassie, PhD is founder and executive director of the Metanexus Institute on Religion and Science <[www.metanexus.net](http://www.metanexus.net)>. Metanexus currently works with some 300 partners at universities in 40 countries. He also serves as executive editor of the Institute's online magazine and discussion forum, with over 370,000 monthly page views and over 8000 subscribers. He has taught in a variety of positions at Temple University, Swarthmore College, and the University of Pennsylvania. He received his doctorate in religion from Temple University in 1994 and his BA from Middlebury College in 1979. Prior to graduate school,

he worked for ten years in international relations and conflict resolution in Washington, DC; Jerusalem, Israel; Berlin, Germany; and Philadelphia, PA. He is the recipient of a number of academic awards and grants from the American Friends Service Committee, the Roothbert Fellowship, and the John Templeton Foundation. He is a member of the Religious Society of Friends (Quakers).

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MONDAY EVENING

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EMERGENCE OF LIFE

**Bruce Weber**

ABSTRACT

All cultures, including the scientific, have narratives of origins that shed light on what and who we are. Darwin in *On the Origin of Species* bracketed off the question of the origin of life as being beyond the scope of his concerns, although in private he did speculate on how life might originate from chemical processes. With the developments in the latter part of the twentieth century of the sciences of complexity it has proven more perspicuous to consider the appearance of life as the result of a process of emergence rather than an event of origin.

Various notions about the emergence of life will be explored. These notions usually take some aspect of living systems, such as ability to replicate, to metabolize, to tap energy in gradients of matter/energy, to have boundaries, to move, or to have agency as the first step in the process of the transition from complex chemistry to simple living forms. A summary of ideas over the past sixty years or so will be presented and an evaluation of the current status of the field provided. Then the possible advantages of a perspective of complex systems dynamics that frees us from delineating the trajectory of this emergence will be considered. Rather than seeking the specific history of the steps of life's emergence and locating "missing links," the view of life from complex systems dynamics allows an investigation of a range of possible "transitional forms" in the process of its emergence. In such an emergence, which is viewed as an interplay of selective and self-organizational principles, new phenomena arise, including the emergence of the natural selection of the reproductively fit. Thus, natural selection is viewed in this approach as an emergent phenomenon rather than as an algorithm. Beyond this, it will be valuable to review possible alternative chemistries that might be compatible with life, not just as we know it on earth, but as it might be elsewhere in the universe. The paths to life may indeed be broader and deeper than we have imagined, and life itself may take forms most wonderful and different, for which we will need to develop a theory of general biology. The sciences of complexity hold the promise of how to proceed in developing theories of emergence and a general biology.

BIOSKETCH

Bruce Weber obtained a BS in Chemistry from San Diego State University and a PhD in Chemistry at the University of California San Diego in 1968, specializing in protein crystallography. He spent two years working on problems in enzymology and bioenergetics with Paul Boyer (Nobel Prize in Chemistry, 1997) at UCLA before joining the faculty of the Department of Chemistry and Biochemistry at California State University Fullerton. In 2001 he was also appointed Robert H. Woodworth Chair in Science and Natural Philosophy at Bennington College. In 2006 he became emeritus professor at both institutions. He and Jim Hofmann have created a web-based course on evolution and creation at [http://nsmserver2.fullerton.edu/departments/chemistry/evolution\\_creation/web](http://nsmserver2.fullerton.edu/departments/chemistry/evolution_creation/web).

His initial research on the evolution of protein structure/function led to a more general interest in molecular evolution, to problems of the origin of life, and later to how information theory, nonlinear dynamics, and nonequilibrium thermodynamics could give insights into the processes of the emergence and evolution of life. With philosopher of biology David Depew of the University of Iowa, he has written *Darwinism Evolving: Systems Dynamics and the Genealogy of Natural Selection* (MIT Press 1995), in which the development of the Darwinian research tradition was analyzed from the perspective of changing systems dynamics. This approach, especially the possible impact of shifting to a complex systems dynamics, has been explored in a number of papers by Depew and Weber and in three additional edited books on evolutionary theory (*Evolution at a Crossroads*; *Entropy, Information and Evolution*; and *Evolution and Learning* – all from MIT Press). He has also written about the history of bioenergetics and co-authored a biography of British bioenergeticist and pioneer theoretical biochemist Peter Mitchell (Nobel Prize in Chemistry, 1978) *Wandering in the Gardens of the Mind* (Oxford University Press 2003). Not surprisingly, he views bioenergetic mechanisms as playing a key role in the emergence of life.

RESPONDENT

**Edmund Robinson**

Edmund Robinson is the Senior Minister at the First Church in Belmont, Massachusetts, Unitarian Universalist. He was a practicing lawyer for 30 years, and lives in Lexington with his wife, Jacqueline Schwab. He is on the IRAS Council and is into Universalist theology, process theology, and all kinds of traditional folk music.

A RELIGIOUS INTERPRETATION OF  
EMERGENCE: CREATIVITY AS GOD

Gordon D. Kaufman

## ABSTRACT

In this lecture I suggest that thinking of God today as creativity (instead of as The Creator) enables us to bring theological values and meanings into significant connection with modern cosmological and evolutionary ideas.

(1) This idea of God removes completely all anthropomorphism and anthropocentrism from the conception of God. The idea of God as the mystery of creativity—the mystery of the ongoing coming into being of new realities in the course of temporal developments in the universe—thus overcomes one of the major reasons for the considerable implausibility of God-talk in today's world. In our modern understandings, the world is a highly dynamic reality, not essentially a stable structure; and God is thought of here as the ongoing creativity in that world.

(2) This conception of God enables us to connect our modern ideas of the Big Bang, cosmic and biological evolution, the emergence of novel complex realities from simpler realities and the irreducibility of these complex realities to their simpler origins, and so on directly with our understanding of God. Creativity in this view is not an explanation of why and how new realities of this sort come into being: it is, rather, simply the name we give to this profound mystery: the mystery of complex things coming into being from things less complex, the mystery of the universe's apparently coming into being from nothing. It is important to recognize that this idea of creativity—of the ongoing coming into being of truly inexplicable novel realities—is very difficult, if not impossible, for us humans to grasp and understand.

(3) For many this mystery of creativity—God—manifest throughout our universe (as we today conceive that universe) is very awe-inspiring. It calls forth emotions of gratitude, love, peace, fear, hope; and a sense of the profound meaningfulness of our human existence in the world—issues with which faith in God has usually been associated in the past. It is, therefore, appropriate today (in my opinion) to think of God as precisely this magnificent panorama of creativity with which our universe, and our lives in this universe, confront us. The ongoing emergence of new realities in our world has a profoundly religious meaning.

## BIOSKETCH

I was born on June 22, 1925, in Newton, Kansas, and I grew up near there on the Bethel College campus, a Mennonite institution of which my father was president for many years. In keeping with Mennonite pacifist teachings, I was a conscientious objector in World War II. After the war I returned to Bethel and finished my bachelor's degree, then went on to take a master's degree in sociology (Northwestern University) and a

PhD at Yale University (1955) in philosophical theology. I joined the Religion Department in Pomona College (California) in 1953, moved to Vanderbilt University Divinity School in 1958, and five years later landed at Harvard University Divinity School, where I stayed the rest of my professional life. During my teaching life I had sabbatical leaves in Germany, England, India, Japan, Hong Kong, and South Africa. My wife and I had four children and they have each brought us grandchildren.

From the beginning of my professional life, I have been concerned with overall philosophical and theological issues bearing on the nature and ordering of our pluralistic human existence in its situatedness here on planet Earth, as well as in the wider reaches of our universe, 14 billion light-years across. I have been especially interested in the wide range of religious and philosophical questions that these matters raise—especially about the meaning (or meaninglessness) of human existence and how it ought to be lived and ordered in today's highly complex civilizations. As a Christian theologian my approach to these issues has been through reflection on the symbols and other resources of Christianity and western forms of humanism and naturalism; but I have also been deeply interested in the way other civilizations, especially Indian and Chinese, have dealt with matters of this sort.

I have written 12 books, and my concerns about these sorts of issues were already evident in my first book, *Relativism, Knowledge, and Faith* (University of Chicago Press, 1960). After working for several years within the "neo-orthodox" stance that I had picked up at Yale Divinity School, some of my increasing difficulties with traditional Christian thinking were set out in *God the Problem* (Harvard University Press, 1972). This led, then, to a major turning point in my understanding of what I was trying to do as a theologian: my new conception of theology as imaginative construction was set out in *An Essay on Theological Method* (originally published in 1975, and still in print in its third edition, Oxford University Press, 1995). And with the help of intermediary trial runs in such books as *The Theological Imagination: Constructing the Concept of God* (1981), and *Theology for a Nuclear Age* (1985, translated into several languages and still in print), I was able to bring together my thinking on the major questions mentioned above in a large book entitled *In Face of Mystery: A Constructive Theology* (Harvard University Press, 1993, still in print). By that time I was 68 years old and felt that I had made my statement about humanity in the world, as best I could. With the publication in 1996 of one more book, on theology and religious pluralism, I was convinced that my book-writing was over and hereafter I would content myself with a little more teaching, some lectures here and there when invited, and some occasional articles.

However, that was not to be. In *In Face of Mystery* (IFOM) I had argued that today we should think of God simply as the creativity manifest throughout our evolutionary universe (instead of as a kind of person-like Creator who decided to bring a world into being

and then did so by issuing a series of commands). But I really hadn't spelled out what I meant by this notion of creativity. About 10 years after publishing IFOM, just out of the blue I suddenly realized one day that we are more or less aware today of three major types of creativity—the Big Bang, the ongoing coming into being of novel realities through evolutionary processes, and human creativity of culture, language, and imaginative symbol-systems of many different sorts. Wouldn't it be an interesting extension of IFOM if I spelled out the notion of God-as-creativity in terms of these three quite distinct modalities? So I went to work on this notion, and it turned out to be very interesting indeed: it involved a considerable extension and transformation of my thinking of God in IFOM and other recent writings. The upshot was a new book, *In the beginning ... Creativity* (Fortress Press, 2004), in which a much more fully developed conception than anything I had heretofore imagined of what it means to think of God as creativity was developed. (The significance of this notion of God-as-creativity with respect to contemporary thinking about emergence in evolution and elsewhere will be the subject of my lecture at Star Island this year.)

Once again, I thought this was surely the end of the road. But it turned out I was again mistaken. Friends of mine pointed out that if one thinks of God in the way I was outlining in the creativity book, one would surely have to understand Jesus in a quite different way than Christians had heretofore imagined. And they were right: it no longer made sense to think of Jesus primarily in terms of such supernaturalistic conceptions as the Son of God, the Savior of the world, the Second Person of the Trinity, etc. But Jesus does remain a very important figure for most Christians; so if all of these traditional conceptions of Jesus had to be given up, what kind of Jesus is left? The result of my reflections on that question is just coming out now in a new small book, *Jesus and Creativity* (Fortress Press, 2006). There I depict a completely this-worldly Jesus, but a Jesus who nevertheless has proved to be enormously creative in human history, all the way down to the present (and is, thus, a very significant manifestation of creativity, that is, of God). So I have now surely come to the end of my own creative work. It's getting too difficult to write books: I'm quite sure this will be the last one.

#### RESPONDENT

##### **Barbara Whittaker-Johns**

Barbara Whittaker-Johns is Senior Minister of First Parish Unitarian Universalist Church in Arlington, MA, and has been in parish ministry for twenty-one years. She studied for the ministry at Harvard Divinity School, and completed a Doctor of Ministry degree at the University of Creation Spirituality in Oakland, CA, a program started by the theologian Matthew Fox. Before becoming a minister, she had a sixteen-year career in education, earning a Master of Science degree in Special Education from Yeshiva University. She has been active in IRAS since 1984, serving as Chaplain in 1987, 1993, 2002 and as Cochaplain in 1999. She was

Vice President for Conference Planning from 1989–1996. She comes to Star Island with her husband, Frank Toppa, and their seventeen-year-old son, Isaac Toppa, who has come to the IRAS conference since he was a newborn. After twenty consecutive years of attending the IRAS conference, she and her family were absent last summer, and she resigned her short tenure as IRAS President, due to her illness, which was subsequently diagnosed as advanced Lyme disease, for which she currently is being successfully treated. She trusts there are no ticks on Star Island and will be especially glad to be back this summer.

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#### TUESDAY EVENING

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### THE EMERGENCE OF EMBRYOS AND DEATH

#### **Ursula Goodenough**

##### ABSTRACT

Unicellular life has always been the most copious on the planet, with countless bacteria, archea, and eukaryotic unicells abounding in every conceivable niche. All of the genetic/molecular tricks used by multicellular organisms to instantiate themselves, including sexual reproduction, emerged in unicells, and once sex showed up, the way was paved for multicellularity to evolve. During the past 20 years, breathtaking strides have been made in understanding the evolution of animal development (“evo-devo”), providing fascinating views of how emergent properties build on emergent properties as embryos literally construct themselves, bottom up. With “immortality” entrusted to a separate germ line, the soma often employs “programmed cell death” during its spectacular differentiation, and death of the soma itself is part of the plan. Hence the core irony: our sentient brains are uniquely capable of experiencing deep regret and sorrow and fear at the prospect of our own death, yet it was the invention of death, the invention of the germ/soma dichotomy, that made possible the existence of our brains.

##### BIOSKETCH

Ursula Goodenough is Professor of Biology at Washington University in St. Louis. Her lab research focuses on the molecular evolution of sex in a eukaryotic algal unicell. She teaches cell biology and evolution, the latter in conjunction with speaker Mike Wysession. She has been a member of IRAS since 1989, is a former IRAS President, and currently serves as VP for Development. This is the fifth IRAS conference that she has had the honor to cochair. She is active in the IRAS Special Interest Group on religious naturalism and has written a book on religious naturalism called *The Sacred Depths of Nature*. She has five children, two of whom (Jessica Goodenough Heuser and Thomas Goodenough Heuser) will be making music for us at this conference, and three grandchildren.

## RESPONDENT

### Karl Peters

Karl Peters is Professor Emeritus of Philosophy and Religion at Rollins College, Winter Park, Florida. He is Coeditor of *Zygon: Journal of Religion and Science* and Adjunct Professor at Meadville/Lombard Theological School in Chicago. In his teaching, research, and writing, he has specialized on issues in science and religion. He focuses on evolution and the concept of God, how we gain knowledge in science and religion, environmental problems, and religious and philosophical issues in medicine. He has published several scholarly articles and the book *Dancing with the Sacred: Evolution, Ecology, and God*. He is a past president of IRAS and currently is Vice President for Conferences. He also is President of the Center for Advanced Study in Science and Religion, and secretary of the Board of the Pastoral Counseling Center of West Hartford, Connecticut. In 1993 he was the founder, organizer, and first president of the University Unitarian Universalist Society, Inc. of central Florida. He now lives in Granby, CT with his wife Marj Davis, and is a member of the Unitarian Society of Hartford. He has been attending IRAS Star Island conferences since 1972 and for the last several years with Marj and grandchildren Jana, Matthew, Sarah, and David Pickart.

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### WEDNESDAY MORNING

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#### ABSENCE LETS THE HEART GROW COMPLEX: EMERGENT EVOLUTION FROM A DARWINIAN HIATUS

Terrence W. Deacon

#### ABSTRACT

"For aught we know, a priori, matter may contain the source, or spring, of order originally, within itself ..."  
— David Hume, *Dialogues Concerning Natural Religion* (1779)

#### Introduction

Despite enormous advances in the biological and cognitive sciences, the most ubiquitous features of human existence—conscious experience, the representational character of thought, the regulation of causal processes with respect to their anticipated or hoped-for ends, conceptions of meaning and value, and so on—appear largely incompatible with the causal logic of the natural sciences.

Long before the dawn of science, however, this disjunction was reflected in the vast majority of the world's spiritual traditions in the form of a dualistic vision of existence. With few exceptions, spiritual traditions have presumed the separate and parallel existence of a spiritual world (where meaning and value are primary) and a physical world (purposeless, degenerative), worlds governed by distinctly incompatible causal principles. And yet even everyday experience also shows us that mind is dependent on brain function and that mental intentions can lead to major physical changes in the world. If these incom-

patible causal domains are ultimately one and the same, then is one illusory?

Unfortunately, the revelations of science have not made it any easier to feel "at home in the universe" either, to use Stuart Kauffman's apt phrase. In recent centuries, science has humbled human vanity by removing us from the center of the cosmos and demonstrating that we are only a species of ape. Many scientists now claim that life reduces to mere chemistry and mental experience to mere computing, and that what little orderliness, design logic, and purpose-like behavior there is was formed by the blind chance and necessity of a pitiless Darwinian logic.

In this regard, science may be too quick to dismiss the relevance of teleology. The emergence perspective does not deny the molecular basis for life or the parallels between aspects of cognition and computation, but it nevertheless shows us that evolution is chemistry becoming information and cognition is evolution becoming teleology, and that these semiotic relationships are as much a part of natural science as are electromagnetism and mass. This unification preserves the reality of teleological phenomena but is at the same time challenging for a view of the sacred that is predicated on the incompatibility of matter and meaning, and which sees purpose and value as arising from beyond the physical world. But in sacrificing dualism to understand the emergence of simple "aboutness" in the origins of life and the emergence of symbolic cognition in human evolution, we will have taken the first steps back from an ancient alienation that has long crippled the human spirit.

#### Talk summary

The extreme divergence of human mental capacities from those of other species marks one of the most challenging emergent transitions in evolution: a point where the organization of cognition seems to have undergone a radical overhaul. Human mental uniqueness has long been cited as a challenge to Darwinian accounts of human evolution. Even among evolutionary biologists, speculations abound invoking unusual megamutations and special selection pressures to explain this apparently unprecedented evolutionary advance. Bringing emergence insights to bear on this problem suggests that we may be asking too much of Darwinism and leaving too much to chance. But our understanding of evolution is changing rapidly, and the link between emergence and evolution is showing evolution to be more complex than we thought only a generation ago.

One of the most surprising realizations about human evolution is that the evolution of language abilities did not require the evolution of novel brain structures, but rather depends on an unprecedented synergistic interaction between brain systems that in other species serve other unrelated functions. The question this raises is, "How was this unprecedented functional synergy achieved by a post hoc selection process that would likely be insensitive to partial synergies?" Would it not require some astonishingly lucky



megamutation to achieve these many coordinated changes in brain organization?

Recent molecular and cellular studies of the complex relationships between evolutionary and developmental processes (a field often termed “evo-devo”) are making it clear that Darwinian processes must be understood in the context of the many levels of developmental process that mediate between genes and mature-organism adaptations. Development turns out to be far more complex than just the following of genetic instructions. It involves complex interrelationships between self-organizing processes and selection processes played out at multiple levels of molecular and cellular interactions. The study of these processes offers a rich domain for exploring the nested logic of emergent processes, and particularly their hierarchic interdependencies of self-organizing (morphodynamic) and Darwinian (teleodynamic) processes. It also offers a context in which to explore the nature of biological information and its analogues in mental processes.

Part of the attraction of evo-devo is that it promises to augment the variation side of the variation/selection logic of evolutionary theory. It is becoming increasingly obvious that much of the structural and functional order that gets generated during embryogenesis emerges from interactive effects, where the role of genes is primarily to create permissive interaction biases and constraints rather than to “instruct” the construction process. The indirectness of these developmental processes provides significant room for higher-order emergent organizing effects to contribute to novel and yet functionally integrated variations when these genetic variables get modified by molecular damage. In this enlarged biological paradigm, Darwinian selection can be seen as a mechanism that “captures” and stabilizes developmental mechanisms that have emerged from the self-organizing and competitive dynamics of molecular-cellular interactions.

In this way of thinking, the stabilizing effect of selection serves to constrain variation in the range of interactions that might result. Thus selection both eliminates variation at the population level and, by maintaining highly specific constraints on developmental processes, it also limits the possibility that novel higher-order synergies will emerge within the range of normal variation. On the other hand, relaxation of selection may facilitate the expression of self-organizational tendencies that are otherwise latent by virtue of decreased specificity of component interactions. So preservation of variations, and partial degradation due to reduced selection, may have been critical antecedent conditions for many of the major transitions in evolution that involve the unprecedented emergence of higher-order relationships. Included among these is the evolutionary emergence of language. Although biologists have long recognized examples of regressive processes in evolution as well as in development, such as is common in the evolution of parasitic species, few would think of the emergence of complex language and symbolic cognition as the result of a regressive process.

I will describe a biological example of a closely related evolutionary effect to illustrate the emergence of increased functional complexity due to the relaxation of selection. Recently a Japanese colleague, Prof. Kazuo Okanoya, has been studying a breed of finches in which reduced selection appears to have led to novel functional synergy, increased song complexity, greater developmental plasticity, and recruitment of numerous brain structures not previously involved in producing song.

Song production in this domesticated species of (a Bengalese finch) exemplifies the paradoxical increase in all these measures of functional complexity despite the absence of selection favoring any of these effects. In the feral ancestor, the song is stereotypic and innately structured. By contrast, in the domestic breed, social transmission of song also plays an extensive role. Historically, breeders did not breed for singing but for feather coloration. Absence of selection on song appears to have led to rapid evolutionary degradation of neural specificity of song control, allowing previously ineffectual inputs from diverse brain systems, as well as biases from social-ecological conditions, to interact in the determination of song structure. Song became more complex, flexible, and adaptive, and its neural control became more complex, because it was not subject to selection. This ultimately allowed functional interactions between previously independent systems and the emergence of unprecedented functional synergies. Parallels between the finch song example and numerous aspects of the human language adaptation suggest that this distinctively human adaptation may likewise have depended on relaxation of selection and the self-organizing effects that this allowed to emerge. A generalized evolutionary degradation effect may also help to explain many other curious aspects of human mental uniqueness.

These paradoxical results exemplify the necessary interplay between Darwinian and self-organizing processes in the evolution of complexity. This is also the defining feature of the simple protolife system—the autocell—described previously. Together these opposite ends of the spectrum of biological complexity suggest that a nested relationship between self-organizing and Darwinian processes is likely a general character of all teleodynamic emergent relationships, including brain function and cognition. The surprising importance of the absence of selection for the emergence of complexity is yet another hint that in order to make sense of emergence we need to pay as much attention to what is not present as we do to what is present.

#### BIOSKETCH

**Terrence Deacon** received his PhD in Biological Anthropology from Harvard University in 1984. He was a professor at Harvard from 1984–1992, a professor at Boston University from 1992–2002, research associate at Harvard Medical School from 1992–2000, and is currently a professor in the Department of Anthropology and the Program in Neuroscience at the University of California Berkeley.

His research has focused on brain evolution and development, and particularly the neurobiology of language. He has authored over 100 published works, and his 1997 book *The Symbolic Species: The Co-Evolution of Language and the Brain*, was an effort to synthesize neurological, evolutionary, linguistic, and even philosophical approaches to understanding human mental evolution. (That book was the 2005 Staley Prize winner for the most important book in Anthropology.) Terry has been a frequent speaker at Star Island, a member and vice president for science of IRAS, and has contributed papers to a number of science and religion dialogue conferences and edited volumes. He lives in the Bay Area with his wife Ray and his son John.

#### RESPONDENT

**Mary Evelyn Tucker**

See the speaker biosketch on page 18.

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#### WEDNESDAY EVENING

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#### ANIMAL SOCIETIES AND THE EMERGENCE OF FRIENDSHIP

**Barbara Smuts**

#### ABSTRACT

Animal societies are clearly emergent: their structures arise “bottom-up” through the interactions of individuals rather than being imposed “top-down” by authority figures or consciously designed political processes. Nevertheless, once they come into being, society-level structures, such as kinship networks or competitive coalitions, influence the behaviors of individuals, whose responses, in turn, contribute to changes in the society. Thus, to understand animals we must move beyond straightforward causal mechanisms to consider processes like multi-directional feedback loops and self-organization. When we view animals in this way, several issues clamor for attention. First, animal societies are without doubt complex systems, but are they complex adaptive systems? In other words, do societal-level properties enhance individual fitness and, if so, how do such group adaptations evolve? This question suggests another: what novelties have emerged in the societies of large-brained, gregarious vertebrates, such as monkeys, apes, cetaceans, elephants, and wolves? We will consider one such novelty: animal friendships. Friends are chosen voluntarily and are picked primarily on the basis of individual qualities rather than traits shared by whole classes of individuals (e.g., gender, kinship, species). Repeated interactions between partners produce emergent patterns that reflect the nature of the relationship, and these patterns in turn influence the future of the relationship. They include particular ways of communicating and of moving in relation to each other, which I will illustrate with videos of interactions among animals I have studied.

These ideas prepare the way for the second part of the talk, which focuses on friendships between humans

and nonhuman animals. On the whole, humans have vastly underestimated the potentials inherent in interspecies friendships. Approached with an open mind-heart, such relationships can greatly enrich our lives and even enhance our quest for spiritual or religious transformation.

#### BIOSKETCH

As a child, I wanted desperately to understand and get to know other animals. Fortunately, my parents supported this obsession, going so far as to store small animal bodies in the freezer along with our TV dinners until the ground thawed enough to permit a respectful burial. They also subscribed to National Geographic Magazine, whose account of Jane Goodall’s research on wild chimpanzees determined my life course. I was 12 at the time, and I decided I would join Goodall in the field as soon as I grew up. As an undergraduate at Harvard I studied primate behavior with Irven DeVore and evolutionary biology with Robert Trivers. Then I entered graduate school at Stanford University, where Jane Goodall was teaching. Twelve years after I first imagined being with wild primates, I began with a study of female chimpanzees at Gombe National Park in Tanzania. I went on to study baboons in Kenya and Tanzania for many years. That work led to a book, *Sex and Friendship in Baboons* (2<sup>nd</sup> edition, 1999, Harvard University Press). In addition to fieldwork with nonhuman primates, I have also had the privilege of studying wild bottlenose dolphins off the coast of Western Australia. I am currently a Professor in the psychology department at University of Michigan, Ann Arbor. Recently, I’ve turned my attention to domestic dogs, whose social lives prove as fascinating as those of any wild animal I’ve observed (plus I get to hug them). Increasingly, I write about my experiences living with other animals for lay readers to encourage greater respect and reverence for the rest of the living world. To this end, I can often be found glued to the tube, watching hundreds of hours of videotapes of my dogs and their friends having fun, as I prepare to write a popular book about dog social behavior.

#### RESPONDENT

**John Grim**

John Grim comes from the Missouri drift plains of North Dakota, where he grew up leaning against the winds until they blew him east to study with Thomas Berry in the history of religions at Fordham University. His area of scholarly exploration is indigenous traditions and towards that understanding he undertakes field studies in the summer with Crow people in Montana, and in the winter with Salish peoples in Washington state. Currently he is Coordinator of the Forum on Religion and Ecology with Mary Evelyn Tucker and series editors of “World Religions and Ecology,” from Harvard Divinity School’s Center for the Study of World Religions. In that series he edited *Indigenous Traditions and Ecology: The Interbeing of Cosmology and Community* (Harvard, 2001). He has been a professor of religion at Bucknell University and Sarah Lawrence College, where he taught courses in Native American and Indigenous religions, World Religions,

and Religion and Ecology. His published works include *The Shaman: Patterns of Religious Healing Among the Ojibway Indians* (University of Oklahoma Press, 1983) and edited volumes with Mary Evelyn Tucker entitled, *Worldviews and Ecology* (Orbis, 1994, 5th printing 2000), and a Daedalus volume (2001) entitled, *Religion and Ecology: Can the Climate Change?* He is also president of the American Teilhard Association. This next year he will be in residence at Yale University.

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THURSDAY MORNING

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STRUCTURAL EMERGENCE IN ECOSYSTEMS  
AND EVOSYSTEMS

Guy Hoelzer

ABSTRACT

The term "emergence" has been used in a variety of ways in scientific discussions during recent decades, some of which represent more trivial concepts than others. For example, some have defined emergence as any phenomenon we are surprised to discover in the behavior of models or reality. If emergence were mainly about our ignorance, it would not contribute to our understanding of how nature works. The definition I use, unless I explicitly indicate otherwise, invokes the de novo origin of new physical structures that largely bound the internal dynamics of a system. The existence of systems is essential to this view, although I recognize that some argue that scientists arbitrarily draw boundaries around so-called systems for study because they are unable to make sense of the ultracomplex whole universe in all its gory detail. I personally think this view is overwhelmingly refuted by our common observations.

In this talk, I will focus on the emergence of dynamic entities in the realms of ecology and evolution. The concept of a coherent ecological system has long been one of the most controversial issues in ecology. Although this debate was never resolved while it was prominent in the literature, more recent research has been published that promises a better understanding and a possible resolution of this question. I will talk about recent research by Mike Gilpin that directly tackles the question of ecosystem existence, which indicates that coherent ecosystems can evolve and that empirical evidence of interactions between ecosystems supports the claim that they exist.

The notion of ecosystems is based on the existence of species, so it naturally leads me to ask about the emergence of species themselves. Does speciation fit the notion of structural emergence described above? The traditional paradigm for explaining speciation invokes divisive factors in the external environment as the cause of speciation. For example, speciation is believed by many to result most often from a splitting of a species' range (allopatry) that prevents gene flow between subpopulations and results in independent evolutionary trajectories. This paradigm also provides for the possibility of speciation without allopatry if the environment would be most efficiently utilized by two

specialized forms, rather than by a single species. In either case, it is the extrinsic environment that is viewed as the cause of speciation, whereas undisturbed populations are seen as dynamically self-stabilizing due to the weeding out of incompatible variants by natural selection. I will present a new model revealing a dynamic that may be inherent to all biological species, in which populations systematically heave toward parapatric speciation (spatially localized, but without a barrier to dispersal) in the absence of any divisive influence from the environment. This view suggests the notion of species and higher-level taxa as "evosystems" independent from their ecological roles. I am not arguing that evolution and ecology are disconnected, rather that coherent systems can emerge at various temporal and spatial scales, as well as in both ecological and evolutionary contexts. I personally see the universe as consisting of emergent "turtles all the way down," all the way up, and in every other direction.

BIOSKETCH

Guy Hoelzer is an Associate Professor of Biology at the University of Nevada Reno. He holds bachelor degrees in both Biology and Psychology from Williams College, a masters degree in Biology from San Jose State University, where he studied the ontogeny of territorial behavior in rockfishes, and a PhD in Ecology and Evolutionary Biology from the University of Arizona, where he researched sexual selection and behavioral ecology in the Cortez damselfish. He did a postdoc on the molecular systematics of macaque monkeys in the Anthropology Department at Columbia University. Since arriving in Reno, he has worked on a wide variety of topics, including historical biogeography, the interplay between social and genetic structure, the application of fluctuating asymmetry in conservation biology, phylogenetics of particular systems, and new methods for (and ways of thinking about) phylogenetics. He is currently focused on the development and potential applications of spatially explicit computational models for the evolution of genetic variation.

RESPONDENT

Sehdev Kumar

Professor Emeritus of Environmental Studies at the University of Waterloo, Canada, He is actively engaged in devising new ways and means of educating older workers in Ontario who get injured at work through World of Learning & Careers. He also teaches a variety of interdisciplinary topics, such as "Clash of Civilizations: Myth or Fact," "Bioethics and Human Destiny," "Human Journey Across the Ages: Culture, Ecology and the Self," "How's and Why's of the Universe: Encounter of Science and Religion" in the School of Continuing Studies at the University of Toronto. He is actively devoted to the promotion of Culture of Peace and Diversity. He has worked as a mediator and an adjudicator in a number of conflicts in Canada and internationally. Author of *Vision of Kabir* about a 15<sup>th</sup> century poet-sage, *Lotus in the Stone*

about sacred arts, and *Jain Temples of Rajasthan*, he writes extensively about cultural issues.

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THURSDAY EVENING

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EMERGING PLANETARY CIVILIZATION

Mary Evelyn Tucker and Brian Swimme

ABSTRACT

Drawing on the ideas of emergence theory, we will suggest that a viable way of understanding the current state of humans is that a multiform planetary civilization is coming forth. Just as out of single cell organisms there emerged multicellular beings, so now we could be in the midst of such a transition from a time when the nation state was a fundamental unit to a period when various transnational entities are emerging. In particular, we see in the appearance of the European Union striking evidence that this process is underway. In addition, the Earth Charter can be understood as a powerful conceptualization necessary for the transformation to take place toward a sustainable planetary civilization.

BIOSKETCH

Mary Evelyn Tucker is codirector with John Grim of the Forum on Religion and Ecology. The Forum arose out of a series of 13 conferences they organized at Harvard on world religions and ecology. Together they were the series editors for the 10 volumes that emerged from the series. She is the editor of the books on Confucianism, Buddhism and Hinduism in this Harvard series. She is also the author of *Worldly Wonder: Religions Emerge into their Ecological Phase* as well as a new book on *The Philosophy of Ch'i* from Columbia Press. She has recently edited a volume of Thomas Berry's papers titled *Evening Thoughts*, which will be published in September by Sierra Club Books and

University of California Press. In the fall she will be a visiting professor at Yale at the Institute for Social and Policy Studies. She is a member of the Earth Charter International Council and was a member of the International Drafting Committee.

Brian Swimme is on the graduate faculty at the California Institute for Integral Studies in San Francisco, where he teaches courses in evolutionary cosmology to humanities students. He was educated at the University of Oregon, where he received his doctorate from the department of mathematics for research in gravitational systems. He is currently working with Mary Evelyn Tucker on a documentary on the epic of evolution. He has had the privilege of being a participant at previous IRAS programs, where he has enjoyed some of the most significant conversations of his life.

RESPONDENT

**Katharine Houk**

For biosketch see the workshop listing on page 23.

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FRIDAY MORNING

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ALL-CONFERENCE DISCUSSION

**Jeremy Sherman, Leader**

BIOSKETCH

Jeremy Sherman directs the general education program and teaches psychology, philosophy, history, and literature at Expression College for the Digital Arts in Emeryville CA. He runs a weekly e-newsletter [www.mindreadersdictionary.com](http://www.mindreadersdictionary.com) translating ideas in emergence, evolutionary, and decision theory for practical application. He has been a student and collaborator with Terry Deacon for 10 years.

## IRAS SEMINAR

In the IRAS Seminar we explore a recent book or manuscript by a member (or members) of IRAS, followed by open discussion by all who would like to participate.

This year we will discuss three papers by Terrence Deacon, which contain material that will eventually become part of a book to be titled *Homunculus: From the emergence of information to the evolution of consciousness*. That book will attempt to refine the concept of emergence and use it to illuminate some previously unresolved issues in the evolution of complex integrated biological functions, including approaches to the evolution of consciousness.

The presentation and discussion will take place just after lunch on Monday, Tuesday, and Wednesday in Marshman. Invited participants will be the author, the

seminar organizer (Michael Cavanaugh), Stacey Ake, Lyman Page, Clifford Matthews, and Ted Laurensen.

DESCRIPTION AND PROCEDURE

On the first day we will discuss a paper entitled "Emergence: The Hole at the Wheel's Hub." It is an overview of Terry's approach to Emergence, and tries to construct a more rigorous set of parameters for a concept that is often too loosely used. Stacey Ake (see biosketch for Stacey and the other invited participants below) will summarize the paper, let Terry respond, and then ask some questions that she believes will both sharpen Terry's own thinking and help us understand what he is trying to do. After Terry responds, the floor will be opened for general

discussion, with priority given to conferees who have read the paper.

On the second day we will discuss a paper entitled "Reciprocal Linkage Between Self-Organizing Processes is Sufficient for Self-reproduction and Evolvability," which represents Terry's current contribution to the origin-of-life discussion, in terms of an "autocell" concept. Lyman Page will summarize the paper, Terry will briefly elaborate if he sees the need, and then Clifford Matthews will ask some questions that he believes will sharpen Terry's thinking and help us understand the issues. Again, after Terry responds, the floor will be opened for general discussion.

On the third and final day we will discuss a paper entitled "The Aesthetic Faculty," in which Terry deals with the emergence of art and its appreciation in humans. Ted Laurenson will summarize the paper and prepare some questions for Terry (again with the aim of sharpening Terry's thinking and helping us understand the issues), after which the floor will be opened for discussion.

#### BIOSKETCHES

For **Terrence Deacon** biosketch, see the speaker listing on page 15.

**Michael Cavanaugh** is a retired lawyer from Baton Rouge, a prior president of IRAS, cochair with Terry Deacon of the 2002 Star Island Conference "Is Nature Enough: The Thirst for Transcendence," and husband of Carolyn McGinnis Cavanaugh for the last 40+ years. He is the author of one book, several articles in *Zygon: Journal of Religion and Science*, and is currently working on another book.

**Stacey Ake** is an assistant professor of philosophy in the English and Philosophy Department at Drexel University, where she has been since January 2004. Before that, she was the editor of the online magazine of the Metanexus Institute, where she got to know most of the wonderful people involved in the science and religion dialogue. She has also worked at the University of Copenhagen, Denmark, where she was a researcher at the Søren Kierkegaard Research Center, as well as a member of the Biosemiotics Circle of the Institute of Molecular Biology and the Niels Bohr Institute. Her interests range from existentialism to neurosciences, with sidesteps in theology, literary theory, neutral evolution, ethics, infectious diseases, and human genetics. She holds doctorates both in biology (with a specialization in evolutionary genetics) and philosophy (with a concentration in semiotics and existentialism with a hint of theology).

She is also a published poet and short story writer who does readings in the Philly area.

For **Lyman Page** biosketch, see the workshop listing on page 25.

**Clifford Matthews** was born in Hong Kong in 1921 and received his early education there. After the outbreak of war and his subsequent experience as a prisoner-of-war in Hong Kong and Japan, he was able to continue his studies after World War II at London University and at Yale (PhD, 1955). After several years in industry carrying out fundamental chemical research, he served as professor of chemistry at the University of Illinois at Chicago from 1969–1992. His research on cosmochemistry and the origin of life led him to use the unifying theme of universal evolution in all his teaching efforts, which included regular courses on Chemistry and Life, Environmental Chemistry, and Chemical Evolution. In addition, he collaborated with other faculty members on interdisciplinary seminar courses open to the whole university, and we at Star Island have benefited from that experience, for example in 1995 when he presented an exciting workshop entitled "Cosmochemistry and the Origin of Life: we are recycled Stardust." He has also been active in the work of the Parliament of the World's Religions (organizing a symposium in Chicago in 1994 and editing the proceedings of that parliament which were entitled Cosmic Beginnings and Human Ends; and in 1999 he organized a symposium for the parliament in Capetown, South Africa entitled "At Home in the Universe" and edited the ensuing book, *When Worlds Converge: What Science and Religion Tell Us About the Story of the Universe and Our Place in It*. In 1999 he also participated in the Synthesis Dialogues with the Dalai Lama in Dharamsala, India.

**Ted Laurenson** practices corporate and securities law in New York City. Although he ultimately decided to go into the private practice of law, in college and law school he focused primarily on philosophy, psychology, and public policy issues. He has always had a deep interest in science and, having fallen away from theism and Catholicism by the time he was 15, became a Unitarian Universalist in his mid-twenties. He is president of the recently founded Unitarian Universalist Religious Naturalists. Having found IRAS a natural home when he first started coming in 1990, he cochaired the 1999 Human Sexuality conference, edited the IRAS newsletter from 2000 to 2004, has continued responsibility for newsletter conference write-ups, and is secretary of the IRAS Council. He has followed Terry's thinking for a number of years and says he is delighted to have the opportunity to comment on Terry's recent work.

## IRAS WORKSHOPS

In IRAS Workshops, topics related to the conference or of continuing general interest are explored and discussed in small groups. Workshops are listed alphabetically by presenter.

### WHY TIMING IS MORE IMPORTANT THAN TIME: EMERGENCE AND SYNERGISM IN BIOSEMIOTIC PROCESSES

Tuesday, 2:50 P.M.–5:00 P.M., Elliot  
(double session)

**Stacey E. Ake**

#### ABSTRACT

In this presentation, I examine the way in which a Peircean Third becomes a First in a biological process, specifically the process of the clotting of blood. Frequently touted as an “irreducibly complex” phenomenon, I will explore the evolution of this response from a semiotic perspective where certain changes at time  $t_1$  preclude options at time  $t_{1+n}$  and so on. As a further example of such emergent semiotic biological process, I will discuss the production of human leukocyte antigens, which are part of the human major histocompatibility complex, for here we find what might be the first steps that the human organism makes toward emergent self-identity.

#### BIOSKETCH

See the biosketch under the IRAS Seminar on page 19.

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### UNIVERSAL ASPECTS OF BIOLOGICAL EVOLUTION: WHICH BIOLOGICAL LAWS, IF ANY, MIGHT BE UNIVERSAL?

Sunday, 4:00pm–5:00pm, Newton Front

**John Ball**

#### ABSTRACT

Astronomers and astrophysicists expect that the laws of physics and chemistry, based on experiments and observations on and near the Earth, apply throughout the Universe. To the extent that biology is emergent from physics and chemistry, we might expect that there are also biological laws, as we understand them. An obvious candidate for such universal biology is Darwinian evolution through mutation (and recombination) and natural (and artificial) selection. This geomorphism, like anthropomorphism, is sometimes justifiable, sometimes just wrong, but if some of the arguments are correct, then some of the laws are universal. In this workshop, there is time to try to sell a few quick ideas. I would like to convince you that: (1) a *level-of-development* parameter can be defined for the biosphere in terms of total usable information, and *progress* can be defined as an increase in this parameter; (2) the fossil record shows that progress has occurred; (3) even after Darwin, we really don't understand why, but (4) we can approach the problem

by considering the differential survival of *replicators* called genes and memes; finally, (5) a reasonable extrapolation predicts continued progress for the bio-system and presumably for life elsewhere in the Universe.

#### BIOSKETCH

I have a PhD in radio astronomy from Harvard, where I worked for some years as a research fellow and Director of Radio Astronomy Facilities. Since 1984 I have been a research scientist in radio astronomy at the MIT Haystack Observatory in Westford, MA. I have a life-long interest in putative extraterrestrial intelligent life, and I have published on this topic and on related topics such as sociobiology. I am seventy years old, and I plan to retire this June, provided that I can finish some projects by then, and perhaps find an adjunct teaching position at some nearby college.

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### CLASSIFICATION, EVOLUTION AND EMERGENCE

Sunday, 2:50pm–3:50pm, Newton Front and  
Monday, 4:00pm–5:00pm, Newton Front

**Muriel L. Blaisdell**

#### ABSTRACT

This is a participatory and playful workshop that will give you experience in classifying a group of animals using evolutionary principles. We will be using “Caminalcules,” artificial animals created by Joseph Camin to study how taxonomists classify organisms. Our activity will introduce issues in taxonomy (classification), relationships between species, and the use of the principle of parsimony. By the end of the session you and your group should have a greater appreciation of taxonomy and evolution as well as of the philosophy of science. No Caminalcules will be harmed in this workshop!

#### BIOSKETCH

Muriel Blaisdell is Professor of Interdisciplinary Studies at Miami University in Oxford, OH where she has taught several courses related to the theme of this year's IRAS conference. This year she has taught “What is Human Nature?,” “Medicine and Society: Cases and Concepts,” and “Religion and Science.” She has a PhD from Harvard University in the History of Science, a MS from Oregon State University in General Science, and a BS from DePaul University in Biological Science. Muriel also works with Miami's Center for the Enhancement of Learning and Teaching.

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NATURAL SACRAMENTS:  
THE PERCEPTION OF ELEGANCE IN SCIENCE

Sunday, 4:00pm–5:00pm, Elliot

**Donald Braxton**

ABSTRACT

Sacrament has historically connoted a moment of material encounter with religiously defined power. This understanding lies at the root of the historical doctrine of *finitum capax infiniti*, the finite bears the infinite. My question is what sacrament might mean within the context of religious naturalism. To seek out some clues to this puzzle, I have interviewed eight scientists on the role of the perception of, and commitment to, elegance in the scientific enterprise. My claim is that elegance connotes in science any moment of perception when fundamental natural order is displayed. It is deeply connected to the power of human intellect and imagination to call forth that which has been hidden, to enable a deep communion of intellect and emotion with fundamental order. I close with some ruminations on how the role of elegance in science might suggest novel practices of sacramentality in religious communities.

BIOSKETCH

Don Braxton is the J. Omar Good Professor of Religious Studies at Juniata College in Huntingdon, PA, where he has been a professor of religious studies since 1989. One of his interests is in the confluence of religion, science, and digital media, of which this project is an example.

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HUMAN CREATIVITY: AN EMERGENT  
EXPERIENCE

Thursday, 4:00pm–5:00pm, Newton Front

**Paul H. Carr**

ABSTRACT

Human creativity is emergent and transcendent: it cannot be reduced to logic. Psychologist Rollo May and physicist Murray Gell-Mann describe the creative process as: (1) IMMERSION, engagement, and intense concentration on a problem; (2) INCUBATION due to a logical impasse, where conscious thought is unfruitful; and (3) ILLUMINATION, the “eureka moment.” New insights come unexpectedly, when we relax. Einstein once said that he had his best insights in the morning when he was shaving. The problem-solving capacity of our unconscious mind is much greater than the conscious. The medieval theologian Meister Eckhart described spiritual transformation as a similar three-step process of being (1) INFORMED, (2) UNFORMED, and (3) TRANSFORMED. The similarity of the creative process for problem solving and spiritual revelation is a way of connecting science and spirituality. Workshop participants will be invited to share their own creative and transforming experiences.

BIOSKETCH

This workshop is based on “The Courage to Create Beauty,” a chapter in Paul’s book *Beauty in Science and Spirit*, which will be published this fall by BeechRiverBooks.com. He received a Templeton Foundation grant for his philosophy course “Science and Religion: Cosmos to Consciousness” at the University of Massachusetts, Lowell. He has published papers in the June 2001, Dec. 2004, and Sept. 2005 issues of *Zygon* and over eighty in scientific journals. In his former life, Paul led an AF Research Laboratory group investigating microwaves, ultrasound, surface acoustic waves, and superconductors, now used in TVs and cell phones. He earned his PhD in physics from Brandeis University and his MS and BS from MIT. Paul’s Web site is: [www.MirrorOfNature.org](http://www.MirrorOfNature.org).

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BUDDHIST MINDFULNESS PRACTICE AS  
A NATURAL SELECTION PROCESS

Monday, 2:50pm–5:00pm, Sandpiper Room and  
Wednesday, 2:50–5:00pm, Sandpiper Room  
(both double sessions)

**Tyrone Cashman**

ABSTRACT

There is, I find, a way that purpose and nonpurpose operate together, in various dimensions of nature; Taoists point to it with their phrase *wei wu wei*, action-nonaction. One example of this is the way the processes of biological natural selection and the concentrated practice of mindfulness without judgment seem to parallel each other. I would like to discuss in the workshop the parallel, if not perhaps the same, causal mechanism between natural selection in biology and the inner liberation from suffering that successful meditation brings. The type of meditation I refer to especially was described by the Buddha in the *Satthipathana Sutta* (“The Four Foundations of Mindfulness Sutra”) and is practiced in Southeast Asia as Vipassana, as well as in the Sino-Japanese Zen tradition that derives from the confluence of Buddhism and Taoism. Over the last three decades, a significant number of meditation groups have grown up in this country and Europe that teach and practice these traditional techniques. Practiced meditators are encouraged to come, also those with no meditation experience. Besides the presentation we will have discussion and probably some brief experiences of meditation practice.

BIOSKETCH

Having spent most of my life in daily meditation practice, eight years as a Jesuit within the frame of the Spiritual Exercises of St. Ignatius, and 35 years mostly in the Zen and Vipassana Buddhist traditions, I am very interested in how meditation works. I received a PhD in philosophy of science (biology) and philosophy of religion from Columbia University in 1974. For twenty years I worked in engineering development and in the political arena, promoting the use of wind energy in the US and worldwide. In the last three years I have been working informally with Terrence

Deacon on questions involved in a theory of emergence and cognitive science.

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RELIGIOUS NATURALISM  
INTEREST GROUP CAUCUS

Tuesday, 4:00pm–5:00pm, Sandpiper Room

**Michael Cavanaugh**

ABSTRACT

IRAS has several Interest Groups in which members can pursue narrower slices of the broader IRAS pie. This caucus is for persons who participate in (or are interested in participating in) the Religious Naturalism Interest Group. The focus of the workshop will be to ask, “What particular goals do we have for the coming year, and how do we want to go about implementing them?” It will be a bit different from the caucuses of the past two years, where a brainstorming approach was taken. This year a particular set of proposals will be presented and discussed, though there may well be time to discuss new ideas as well.

BIOSKETCH

See the biosketch under the IRAS Seminar on page 19.

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THE DYNAMICS OF PATTERN FORMATION  
IN SIMPLE GEOLOGIC SYSTEMS

Sunday, 2:50pm–3:50pm, Elliot

**George Fisher**

ABSTRACT

As sedimentary rocks are buried, mineral assemblages that were stable at surface temperatures and pressures tend to react to form new mineral assemblages stable at higher temperature. Some such rocks contain structures that record local diffusion involved in the chemical reactions that formed those new assemblages. This workshop will show how these structures can be modeled by simple thermodynamic methods and how those models can help to understand self-organization in what Deacon has called second-order or morphodynamic emergence.

BIOSKETCH

George Fisher has been at Johns Hopkins University since 1966, and is now emeritus professor of geology. For 20 years, his interests centered on the geology of the Appalachian Mountain system and on ways in which heat flow, diffusion, and chemical reactions interact in deeply buried rocks. In the 1980s he spent four years as Dean of Arts and Science. When he returned to teaching, his interests began to shift toward questions of how humans can live within the limits imposed by the Earth system, and to philosophical and religious ways of understanding the place of humans in the cosmos. Though retired from full-time teaching, he continues to teach at Johns Hopkins and at St Mary’s Seminary and University. George studied geology at Dartmouth College (BA, 1959) and

at Johns Hopkins (PhD, 1963), and theology at St Mary’s (MA, 2002).

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HUMANIST AND NATURALIST  
RELIGION AND ETHICS

Tuesday, 4:00pm–5:00pm, Marshman

**Roger Gillette**

ABSTRACT

After presenting some introductory quotations, I present definitions of theology, religion, and ethics much like those I have proffered in previous papers, including my paper in the June 2005 issue of *Zygon*. I then describe humanism and naturalism mindsets or philosophical positions. Based on these definitions, I suggest that while the major world philosophical and religious traditions support or are based on a humanist mindset, current findings of science support or are the basis for the naturalist position. With this preparation I am in a position to contrast humanist and naturalist religion and ethics, and to assert that while a fully humanist religion and ethics could greatly improve the well-being of the human species within the current century, only a fully naturalist religion and ethics can save the Earth’s biosphere, including the human species, from destruction within the current millennium.

BIOSKETCH

After about 30 years working in systems analysis and development, I switched careers about 20 years ago to analysis and development of religion in an age of science, and became a participating member of IRAS and a regular attendee of IRAS Star Island meetings. I have presented several papers on the subject in Star Island Free University sessions and at UU Collegium and PNWR AAR meetings. Some of these papers have been published: two in *Zygon* and one in Meadville-Lombard’s on-line *Journal of Liberal Religion*.

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RELIGIOUS NATURALISM IN IRAS AND IN  
UNITARIAN UNIVERSALISM

Sunday, 4:00pm–5:00pm, Sandpiper Room

**Ursula Goodenough and Joan Goodwin**

ABSTRACT

Religious naturalism (RN) entails an exploration of the religious potential of our understandings of the natural world. This workshop will introduce two on-going RN initiatives: the RN Interest Group associated with IRAS, and a proposed affiliate group within Unitarian Universalism called UU Religious Naturalists. We welcome both those who are already involved in these activities and those who are curious about what we are up to.

BIOSKETCHES

Joan Goodwin is a(n almost) lifelong Unitarian Universalist who worked for many years as a religious



educator and denominational bureaucrat. She was part of a team appointed to develop a UU multimedia curriculum on evolution for 3<sup>rd</sup> and 4<sup>th</sup> graders (Human Heritage Parts I and II) and in the process learned more science than she ever had in school. Now blissfully retired, she is a writer interested in religion, the natural world, the epic of evolution, poetry, and women's history and biography. Her book, *The Remarkable Mrs. Ripley: The Life of Sarah Alden Bradford Ripley*, was published in 1998 by Northeastern University Press. She attended her first IRAS Star Island conference in 1993, served as secretary for five years, and continues as a Council member. Her current project is researching and writing a fifty-year history of IRAS.

For Ursula Goodenough's biosketch see page 13.

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### RE-ENCHANTMENT: COMING TO OUR SENSES WITHIN THE NATURAL WORLD

Sunday, 2:50pm–5:00pm, Marshman  
(double session)

**Katharine J. Houk**

#### ABSTRACT

A spirituality of Nature offers practices that can heal our disconnection from the natural world, lower our stress levels, improve our relationships with the environment and one another, help us create stories to live by, and add fun and pleasure to our lives. Actively and consciously awakening our many natural senses—hint: there are way more than five—can put us in touch with the Real, which is sustaining, fulfilling, and healing, and which goes by many names. Magic is in the air! Join me in exploring the matter, relationships, and energy of our world by using the sensitivity which is everyone's birthright, as I introduce an art/ministry/education project I've been developing that plays with the process of extending (and discovering) ourselves in the natural world's intelligence: our origin and the living wellspring within each of us.

#### BIOSKETCH

Katharine Houk has dubbed her combination of ministry and creativity "Art & Soul." As a member of One Spirit Interfaith Outreach and the Unitarian Universalist Society for Community Ministries, she is engaged in ministry in her community and is Director of Wellspring Haven, a nonprofit organization that encourages women's creativity, spirituality, leadership, and vision. In balance with this work, Katharine indulges her passion for visual and tactile beauty through creating nature-oriented textile art. Her latest re-enchantment project is the creation of a portable environment for conducting outdoor events related to nature and spirituality. Her degree in textile design is from the State University College at Buffalo, NY. Katharine is a graduate of both Hartford Seminary (CT) and One Spirit Interfaith Seminary (NYC). Star Island has been her spirit's home since she began attending Star conferences as a teen. In her precious free time, she enjoys her growing family, walks in the woods, writing, dancing, and shape-shifting.

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### EMERGENCE: WHERE HOLISM AND REDUCTIONISM MEET: REPLACING PHYSICS WITH A MEANINGFUL METAPHYSICS

Sunday, 4:00pm–5:00pm, Pink Parlor and  
Monday, 2:50pm–3:50pm, Pink Parlor

**Jerry Josties**

#### ABSTRACT

Explanations of emergence generally favor either a holistic or a reductionistic solution. I am going to suggest that it is a viable philosophical position to suppose that emergence occurs precisely where holism and reductionism meet, and that this is why nature evolves a hierarchy of nested wholes. Emergence refers to the appearance of new "wholes," but in keeping with the laws governing their constituents. The laws themselves refer to the universe as a whole, or they would not be considered to be laws. Therefore the understanding of new wholes, or emergence, clearly involves direct reference both to their constituent parts and to the largest whole, the universe. Reductionism is often overemphasized in scientific discussion because of the semantic mistake of overlooking the ontological reality of the universe considered as a whole when reference is made instead to the "laws of nature." The laws actually represent the relation of the parts to the Great Whole. Physics is a very sophisticated integrated description/model of the measurable aspects of our world, but is not an ultimate explanation, simply because its laws are not explicable within physics itself. For the correct categories of explanation, we must look beyond physics to metaphysics. In this workshop we will discuss what explanation is, and then outline a metaphysics that can provide an explanatory framework for re-interpreting physics, neuroscience, and emergence. This will involve a thorough-going holism and panpsychism. All emergence occurs as the result of mutual deference (respect, love, lowering of the ego) among the constituents-to-be, which amounts to a partial transfer of identity to a new higher-order whole. The overall degree of mutual deference translates into the degree of coherence or stability of the new whole. The metaphysics suggested here can enable our personal encounter with the universe to be embedded in an ultimate story of infinite love. We will also offer suggestions for understanding "qualia" (qualitative conscious experience; e.g., color) as well as several aspects of physics, including a proposal for explaining the difficulties in "theories of everything" in terms of our metaphysics.

#### BIOSKETCH

Jerry Josties is a retired astronomer living in Silver Spring, MD. He was born in Hastings, NE, received a BA from Swarthmore College in 1960, studied philosophy for one year at Keele University, England, and physics and astronomy part-time until 1969 at the University of Chicago, Indiana University, George Washington University, and the University of Maryland. He was married in 1965 to Esther Sorensen of

Denmark, and has three children and almost six grandchildren. In 1968 he had a major "Aha!" experience concerning the importance of integrating consciousness into physics, which abruptly altered his worldview and caused him to terminate his education. He was employed at the Naval Observatory in Washington, DC from 1960 to 2002, and taught astronomy and cosmology part-time at Hood College in Frederick, MD from 1987 to 1994. His primary interest since 1963 has been to develop a re-interpretation of physics and neuroscience in terms of an intuitively intelligible metaphysics.

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AFTERNOON WALTZING: A PHYSICAL  
EXPERIENCE WITH EMERGENCE

Wednesday and Thursday, 4:00pm–5:00pm,  
Brookfield

**R. Kent Koeninger**

ABSTRACT

Anyone who can count to three can waltz, but can they waltz well? In this workshop we will constrain the waltz to its simplest forms, which anyone can learn in one easy lesson. What can emerge is a mindful experience, the magic of waltz, repeatable with multiple waltz partners. Indeed, the more this system is constrained—the simpler, slower, and more repetitive the movements—the greater the emotional impact. To moderate this impact we introduce a modicum of complexity in the form of simple turns. So not only can anyone learn to waltz, by applying principles of emergence, anyone can learn to waltz amazingly well—and in only one lesson! All teens and adults are welcome, beginning or with experience.

BIOSKETCH

I practice multiple forms of dance several times a week and enjoy teaching the simplicity of waltz at dance folk festivals. When not dancing, I have dabbled a few decades at deploying, designing, and marketing some of the largest computers in the world. My career started in the Homebrew Computer Club at SLAC in Silicon Valley, building my first computer at home in 1978. Since then, I have been a migrant worker, designing or deploying supercomputers at NASA, Apple, and Cray, and now at HP, with a few other stops in-between. I travel often to learn or speak about high-performance computing. This is my second year at IRAS. Last year IRAS literally transformed my life and, as a result, I now live in Nashua, NH, St. Louis, MO, and Chilmark, MA.

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RELIGIOUS DIVISIVENESS

Monday, 4:00pm–5:00pm, Marshman

**Ed Lowry**

ABSTRACT

This workshop will explore ways that religious claims interfere with social cohesiveness and ways to circum-

vent the barriers. How much can aspirations to higher morality in religion be used to encourage reevaluation of their divisive tendencies? Are there helpful ethical values that transcend doctrinal divisions? What kinds of claim are most divisive? How are such claims best justified? How adequate are the best justifications? Can careful language help bridge the chasms? Do monolithic appearances needlessly discourage dialogue? What problem focus in this area can best allow for durable progress? How well can such a problem-solving focus help manage noise levels in a free spirituality?

BIOSKETCH

Ed Lowry did software research at IBM and Digital Equipment Corporation for 33 years after studies at University of Toronto and MIT. He has worked on optimizing the fine structure of information to minimize complexity. He is working to apply the result in technical education. He would like to relate science and religion using an engineering perspective that increases information quality in both. He has developed pictorial models of electromagnetic fields and pioneered global compiler optimization. His Web site is: <http://users.rcn.com/eslowry>

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HOW WELL DO CURRENT MODELS BASED  
ON COMPLEXITY THEORY EXPLAIN THE  
EVOLUTION OF RELIGIOUS GROUPS? A  
MORMON CASE STUDY

Tuesday, 4:00pm–5:00pm, Newton Front

**Robert McCue**

ABSTRACT

We will summarize the social science literature relative to how religious groups form and evolve, and then focus on the current state of computer programs based on complexity theory that model certain types of social behavior. We will discuss the social and individual behavior these models predict in light of Bob's experience as a former conservative Mormon and leader within a Mormon community. This analysis will highlight how a particular religious organism defends itself against evidence and social forces that could delegitimize it; how "believers" react to various kinds of evidence in this regard; and the role that organizational rules and epistemic norms play in this process at the personal and institutional levels.

BIOSKETCH

Bob McCue is a tax attorney in Calgary, Canada. He has a BA (Russian language major; religious studies minor), an MBA, and a law degree. His law practice is oriented toward mergers and acquisitions, public financings, and dispute resolution with Canada's taxation agency. Until 2002 Bob was a fully participating, conservative Mormon and held a variety of Mormon leadership positions, including that of "bishop." He then resigned his membership in the Mormon Church as a result of becoming acquainted with Mormonism's history, which resulted in the ter-

mination of most of his relationship with his primary community. This experience caused him to become intensely interested in the effect of social forces on the individual's apprehension of reality.

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OUR BRAINS AND US: NEUROETHICS,  
RESPONSIBILITY, AND THE SELF

Sunday, Tuesday and Thursday,  
2:50pm–3:50pm, Pink Parlor

**E. Maynard Moore**

ABSTRACT

(1) "What is 'SELF' Anyway?" Let's try to find some points of agreement for this concept, so that when we speak about neuroethics and responsibility, we have some clarity about who/what the subject might be. (2) "What is 'FREE WILL' Anyway?" What are the assumptions about the human being as a "moral agent" on which we must agree if the concept "responsibility" has any meaning at all? (3) "What is 'MIND' Anyway?" Given that the brain can be "manipulated" and "enhanced," what does that have to do with "Mind" (and "Self" and "Morality")?

BIOSKETCH

Dr. Moore received his BA at Randolph-Macon College in Virginia, and went on to take graduate degrees at Perkins School of Theology, Southern Methodist University, an MA in Social Ethics at the University of Chicago, and a PhD in Adult/Continuing Education at Union Institute and University in Ohio. Maynard has served on several boards of trustees in youth and religious organizations, and holds memberships in professional societies such as the American Association of Higher Education, the National Council of Resource Development, the National Council on Planned Giving and the Society for Ecological Restoration. He has two grown children and lives with his wife Paula in Bethesda, MD.

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TELLING THE UNIVERSE STORY

Tuesday, 2:50pm–3:50pm, Newton Front

**Jennifer Morgan**

ABSTRACT

Telling the Universe Story in a captivating and understandable way is challenging. Award-winning author Jennifer Morgan will discuss how she presents the story in schools, libraries and museums. She will also give a dramatic reading from her Universe Story Trilogy wearing an "electrifying universe robe." Her stories are told in the first person, by the Universe itself, a voice that listeners hear as heartfelt as well as educational.

BIOSKETCH

Jennifer Morgan's first two books, *Born With a Bang* and *From Lava to Life*, have been published to critical acclaim, receiving the highest review ratings possible

from AAAS. *Born With a Bang* won Learning Magazine's Teachers Choice Award. Her third book, *Mammals Who Morph*, will be released in September, 2006. Jennifer studied cosmology, biology, and anthropology at Princeton University and worked with numerous scientists in those fields. She holds a BA in theology from the University of San Francisco and an MBA from Rutgers University.

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ARE THE MORAL, POLITICAL, AND  
AESTHETIC NEEDS OF THE WORLD BETTER  
SERVED BY AN ETHIC BASED ON THE  
NATURAL OR ON THE SUPERNATURAL?

Wednesday, 4:00pm–5:00pm, Elliot

**Lyman A. Page and Donald Braxton**

ABSTRACT

The term "secular" or "worldly" applied to value systems is taken by many to imply a loss of certain standards of morality, that "something greater" is needed. Religious Naturalism rejects that idea. This session is intended to be a working workshop (full participation) to explore the issue. The presenters will provide short introductions and statements sufficient to stimulate discussion to fill the hour. Some easily accessible reading in addition to the conference reading list (particularly noting Goodenough 1988 and Morowitz 2002): KR Miller 1999, *Finding Darwin's God*, New York: HarperCollins. *Zygon* papers: PR Boehlke et al. 2006, 41:415; DM Braxton 2006, 41:347; JC Caiazza 2006, 41:235 and 40:9; P Hefner 2006, 31:231; M Orr 2006, 41:435; LA Page 2006, 41:427; I Shafer 2005, 40:891; J Wattles 2006, 41:445.

BIOSKETCHES

Lyman Page is clinical professor, emeritus of Brown University School of Medicine. He is a retired pediatrician/pediatric endocrinologist and biochemist with an interest in genetics. He has spent his entire career engaged in teaching in contexts of full-time academic and bench research, clinical research, and clinical practice. He was raised a Congregationalist but has considered himself a "Christian atheist" since some time in early childhood. After two decades of inactivity he reactivated churchgoing on his wife's urging, attracted by the minister (who 30 years later introduced him to IRAS) and the opportunity to sing in the choir, which he continues to do. His philosophical orientation derives especially from literature (sacred and profane) and biological sciences.

See the biosketch for Donald Braxton on page 21.

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## EMERGENCE AS THE BRIDGE CONCEPT?

Sunday and Tuesday, 4:00pm–5:00pm, Sandpiper Room

**Edmund Robinson**

### ABSTRACT

People like me who approach the science–religion dialogue from the religion side are inclined to look on emergence as an exciting bridge concept, a way to resolve the dualisms of mind and matter, of objective and subjective, of the perspective which takes the natural world as its given and the perspective which takes the human soul as its given. Will the idea of emergence as it has developed in the natural sciences bear this weight, or is this wishful thinking, at best, and distortion, at worst, on the part of the religious advocate? I will bring some process theology into this discussion and I welcome other perspectives as well.

### BIOSKETCH

Edmund Robinson is a Unitarian Universalist parish minister in Belmont, MA. He is on the IRAS council and is a former lawyer. When he isn't trying to comfort the afflicted, afflict the comfortable, or figure out the answers to life's persistent questions, he plays banjo, fiddle, and concertina, and leads songs at happy hour.

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## POETRY AS EMERGENCE

Monday, Tuesday, Wednesday and Thursday, 4:00pm–5:00pm, Pink Parlor

**Bob Schaible**

### ABSTRACT

In this workshop we shall read and discuss the most recent book of poems by Pattiann Rogers, one of our best poets for bringing together the poetic imagination, spiritual yearnings, and the discoveries of science. The book, *Generations*, will be on sale in the Island bookstore. Although the poems may not deal explicitly with emergence as it is defined for the conference, all poems are, of course, illustrations of emergence, which, in its simplest formulation, is a consequence of relationships. Indeed, poetry is a manifestation of emergence at the highest of levels. After all, the pleasure of poetry is a consequence of syntactic relationships and the relationship of word-meaning to word-meaning, meaning to sound, sound to sound, rhythm to sound and meaning, language to personal experience and to culture, sign to reality, poem to reader/listener, and reader to reader—all in an endless spiral of fluid, ever-changing connections. And the most powerful trope of poetry, metaphor, is a bringing together of two unlike properties, concepts, or entities in a way that produces entirely novel and fresh meanings. The more explicit discussions of emergence will never, therefore, be too far from our own emerging awareness of the meanings and impacts of the poems to which we shall give our careful and patient attention.

## BIOSKETCH

Bob Schaible is a professor of arts and humanities at the University of Southern Maine. His teaching and scholarship are primarily interdisciplinary in the areas of literature, religion, and science. He has served as a consultant or facilitator in a number of programs funded by the NSF and NEH designed to help both secondary and college-level faculty develop curricula that bridge the gap between the sciences and the humanities. His article "What Poetry Brings to the Table of Religion and Science" (*Zygon*, June 2003) might well provide a good background for the workshop. More recently he has been on sabbatical studying the tensions between the university and the political and religious right, and, more specifically, the place for authentic-self teaching (a nuanced form of advocacy teaching) in this context.

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## EMERGENT IMPROVISATION: A DIALOGUE BETWEEN ARTISTS AND SCIENTISTS

Monday, 2:50pm–5:00pm, Elliot (double session)

**Susan Sgorbati**

### ABSTRACT

Emergent Improvisation is a research project into the nature of improvisation, understood to mean the spontaneous creation of integrated sound and movement by performers who are adapting to internal and external stimuli, impulses, and interactions. Ordinarily we think of order and form as externally imposed, composed, or directed; in this case new kinds of order emerge, the products of dynamic, self-organizing systems operating in open-ended environments. This creation of order from a rich array of self-organizing interactions is found not only in dance and music, but also in a wide variety of natural settings: a range of initial conditions gives rise to collective behavior that is both different from and more than the sum of its parts. Evolution, for example, is decidedly improvisational and emergent, as is the brain function that lies at the heart of what it is to be human. In linking the creative work of art-making to the emergent processes evident in nature, there is basis for a rich and textured inquiry into how systems come together, transform, and reassemble to create powerful instruments of communication, meaning, and exchange. This presentation explores the ways in which natural processes underlie creative expression along with the possibility that art can help illuminate nature.

### BIOSKETCH

Susan Sgorbati has been seriously investigating improvisation as a method for teaching, composing, and performing for twenty years. For the last five years in collaboration with scientists, she has been exploring the relationship between dance and music improvisation and complex systems. Her work has led her to three residencies at the Neurosciences Institute in La Jolla, CA, under the tutelage of Dr. Gerald Edelman and a dialogue with Dr. Stuart Kauffman, who

was in residence at Bennington College in the fall of 2004. She has cotaught several courses with Dr. Bruce Weber on Emergence, Complexity, and the Embodied Mind. She is currently on a national tour of The Emergent Improvisation Project, which is supported by the National Performance Network Creation Fund with the Jerome Robbins Foundation, the Bumper Foundation, the Neurosciences Institute, Bennington College, the Flynn Center for the Performing Arts, and the International Conference on Complex Systems. Susan Sgorbati is on the Dance Faculty at Bennington College, where she was the former Dean of Faculty, and has been teaching since 1983. She is also a professional mediator for the Vermont Attorney General's Office and the Vermont Human Rights Commission. She holds the Barbara and Lewis Jones Chair for Social Activism at Bennington College, and in 1999 she created Quantum Leap, a program that reconnects at-risk youth to their education. She was recently awarded the First Annual David G. Rahr Community Service Award from the Vermont Community Foundation.

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### THE NEURAL BASIS OF HUMAN MORAL COGNITION

Thursday, 2:50pm–5:00pm, Elliot  
(double session)

**William Shoemaker**

#### ABSTRACT

Recent functional imaging studies and clinical evidence indicate that a remarkably consistent network of brain regions is involved in moral cognition. These findings are fostering new interpretations of social behavioral impairments in individuals with brain dysfunction, and require new approaches to enable us to understand the complex links between individuals and society. Based on a recent review by Moll, et al. (Nature Reviews/Neuroscience, 2005), this workshop will present their view of how cultural and context-dependent knowledge, semantic social knowledge, and motivational state can be integrated to explain complex aspects of human moral cognition. The workshop will begin with a brief introduction to brain structure and function in order to provide a common background for discussion. In addition, recent neurobiological research in children and developing animals will be discussed in the context of genetically determined versus early-life acquisition of brain abnormalities that produce moral behavioral impairment.

#### BIOSKETCH

Bill Shoemaker received his PhD from MIT and has held positions at the National Institute of Mental Health, the Salk Institute, and (currently) the University of Connecticut Health Center in Farmington, CT. He is in the psychiatry faculty, where he teaches residents and medical students, and in the neuroscience graduate program. Dr. Shoemaker has published more than two hundred articles and abstracts based on his active research program.

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### CONFRONTING A SURFEIT OF PEOPLE: REDUCING GLOBAL HUMAN NUMBERS TO SUSTAINABLE LEVELS

Thursday, 4:00pm–5:00pm, Newton Front

**J. Kenneth Smail**

#### ABSTRACT

One “emergent phenomenon” that has appeared over the past 150–200 years (or less) is the potentially toxic combination of global overpopulation, growing per capita consumption, ecological degradation, and the rapid exploitation of finite fossil-fuel resources (and growing concerns about the downslope of “peak oil”). For example, the Earth’s population has grown from about a billion in 1800 to 6.5 billion at present, and will likely reach nine billion by the year 2050. Unless significant mitigating steps are undertaken, beginning as soon as possible, it seems likely that the future of modern industrial civilization could well be at considerable risk. This workshop will address this general topic, with a primary focus on the need for significant global population reduction.

#### BIOSKETCH

I am a recently retired Professor of Anthropology at Kenyon College, Gambier, OH, whose professional training has been in physical anthropology/human evolutionary biology broadly-defined (PhD, Yale, 1976). Most of my writing over the past two-plus decades has focused on peace and conflict resolution issues (the “peace hostage” concept) and global demographic and environmental concerns.

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### GROWING RELIGIOUS NATURALISM: ONE CONGREGATION’S EXPERIENCE

Monday, 2:50pm–3:50pm, Newton Front

**Dan Solomon**

#### ABSTRACT

How can we develop an authentic religious experience, drawing on an ancient tradition like Judaism, without having to check our scientific beliefs and respect for reason at the door? At Beth Or (“House of Light”), a progressive Reform Jewish congregation in Deerfield, IL, we have been evolving our own naturalistic approach to Judaism for more than thirty years. Now, under the leadership of Rabbi David Oler and with the help of marketing consultant Adam Hansen (both of whom are IRAS members), we are exploring new ways to refine our message and find a broader audience. In this workshop, Beth Or board member Dan Solomon will outline the creative process of communal self-exploration that is helping us to better express what our brand of naturalistic religion means to us, and articulate what it can offer to others. The lessons learned from this process will be of value to anyone who is trying to refine a message of religious naturalism, whether within a local congregation, an on-line community, or as a lone voice crying in the wilderness.

## BIOSKETCH

I make a living as a software developer in Chicago, while pursuing my more serious interests in philosophy, science, religion, family, and hiking the Appalachian Trail. My career carried me from a BS in physics through graduate work in biopsychology to a doctorate in computer science. Other stops have included work at NASA, for a telecommunications company, as a professor at a small liberal arts college, and developing software for doctors and lawyers. A sense of naturalistic spirituality has been a constant that has helped me keep my balance throughout. After years in the religious wilderness, my wife and I were thrilled to find at Beth Or a place where we could explore all aspects of our Jewish heritage while maintaining our intellectual integrity.

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## THE EMERGENCE OF "EMERGENCE"

Monday and Tuesday, 2:50pm–3:50pm, Marshman

**Jerome A. Stone**

### ABSTRACT

We shall explore the ideas of some philosophers and theologians (1920s–1950s) who developed religious implications of the concept of emergence. Does God work through emergence? Or is God the principle of emergence? What does this language signify and when is it appropriate? Discussion will be based on handouts introducing the ideas of: Jan Christian Smuts, South African statesman and botanist who probably coined the term "holism"; Samuel Alexander, British religious naturalist philosopher who developed a systematic philosophy based on emergence in *Space, Time and Deity*; Roy Wood Sellars, prominent American philosopher who helped draft the first *Humanist Manifesto*; Henry Nelson Wieman, American philosophical theologian and religious naturalist who anticipated complexity theory and influenced Karl Peters, co-editor of *Zygon*; Bernard Meland, American theologian for whom emergence played a key part in his theology and influenced Philip Hefner, co-editor of *Zygon*.

## BIOSKETCH

Jerome Stone is Professor Emeritus of Philosophy at William Rainey Harper College and teaches 20<sup>th</sup> century American liberal theology and non-Western world religions at Meadville Lombard Theological School. A United Church of Christ pastor for eighteen years, Jerry is currently in Preliminary Fellowship with the Unitarian Universalists. Author of *The Minimalist Vision of Transcendence: A Naturalist Philosophy of Religion*, he is now working on a history of religious naturalism.

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## NARRATIVE ENGAGEMENT: NEUROMYTHOLOGY AND RELIGION

Wednesday, 2:50pm–3:50pm, Elliot

**John A. Teske**

### ABSTRACT

How do myths, narratives, and stories engage human beings, produce their sense of identity and self-understanding, and shape their intellectual, emotional, and embodied lives? It is our engagement with the metanarratives of religious imagination by which we address a set of existentially necessary but ontologically unanswerable metaphysical questions that form the basis of religious belief. This presentation will sketch a multileveled understanding of evolutionary biology, history, neuroscience, psychology, narrative, and mythology that might ultimately produce a coherent picture of the human spirit. Neuropsychological functions involved in constructing and responding to the narratives by which we form our identities and build meaningful lives include memory, attention, emotional marking, and temporal sequencing. It is the neural substrate, the emotional shaping, and the narrative structuring of higher cognitive function that provide the sine qua non for the construction of meaning, relationship, morality, and purpose that extend beyond our personal boundaries, both spatial and temporal. This includes (1) a neural affect system shaped by our developmental dependency; (2) the dynamic narratives of self developed in the formation of identity, and reconstructed over the life-span, drawing on (3) culturally available mythic and storied forms. Narrative constitutes our movement in moral space, and may have the potential both for healing and for disruption, for us as individuals and as a species, providing a contingent solution to the alienation and fragmentation of personhood, relationship, and community.

## BIOSKETCH

John Teske's academic specialty is in personality and social psychology, and he has published empirical research on nonverbal behavior, environmental psychology, cognitive development, and close relationships. His scholarly interests over the last decade have shifted to evolutionary psychology, philosophical psychology, and the science-religion dialogue, particularly in the neuropsychology of spirit. He has published regularly in *Zygon: Journal of Religion and Science* and in *Studies in Science and Theology*, and contributed several entries to the *Encyclopedia of Religions and Science*. He is currently the president of IRAS, is a member of the European Society for the Study of Science and Theology, and is a founding member of the Elizabethtown College Center for Science and Religion. His teaching interests include social and personality psychology, the history of psychology, and interdisciplinary courses such as "Mind and Brain," "Narrative and Identity," "Brain, Mind and Spirit," "Psychology through Shakespeare," "Psyche and Film," and a new seminar on "Neuromythology." The material for this workshop appeared in the March

2006 *Zygon*, but without the cool PowerPoint slides. He is a second-generation contributor to the science/religion dialogue and believes that this is likely to be a multigenerational project with no less an impact than the Reformation.

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## EXPERIENCING EMERGENCE THROUGH ART

Wednesday, 2:50pm–3:50pm, Pink Parlor

**Frank Thoms**

### ABSTRACT

What can we learn about our emerging understanding of Emergence from a painting? Come to this workshop prepared to contemplate an abstract painting that has texture, movement, colors, and subtlety. Out of this contemplation, we will discuss what we see, feel, and intuit from the painting. The intention will be to enter the workshop seeking to understand our own understandings of Emergence; to contemplate/meditate on a painting; to listen and share thoughts; and to leave with a deeper understanding of our own understandings of Emergence. I will be bringing an oil painting by my wife, Kathleen Cammarata, that I thought of right after first learning about this year's theme, Emergence. You can check her Web site [kcammarata.com](http://kcammarata.com) to see the diversity of beautiful work that she does.

### BIOSKETCH

Frank Thoms will be on Star Island for his third time. Last year, he enjoyed leading a workshop on the film "What the Bleep Do We Know?" As a lifelong teacher and now a teacher of teachers, he is fascinated with the learning process, particularly with the power of listening in an open format that respects ideas, intuition, insight, and curiosity. He lives in a loft in downtown Lowell, MA, surrounded by his wife's beautiful work.

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## A WITTGENSTEINIAN INTRODUCTION TO THE INFLUENCE OF LANGUAGE ON THOUGHT

Wednesday, 2:50pm–5:00pm, Newton Front  
(double session)

**Eugene Troxell**

### ABSTRACT

Most people can agree that our language has a certain amount of influence on our thinking. Understanding this, however, does not enable one to recognize individual instances of the language/thought relationship as they occur in one's own thought processes. In order to do this we need to learn to notice some common features of words that are not controversial once one notices them, but which we had not been accustomed

to noticing. That is why Wittgenstein describes what he is talking about as "Noticing what is always before one's eyes." Through many years of teaching philosophy courses dealing with Wittgenstein's thought, I developed a number of techniques that can be used to call people's attention to features of the language that are not in accord with how we usually think of the language, but which are obvious once one learns how to notice them. In this workshop I will demonstrate several of these "games" that I had students play. The immediate result of a session of playing these games was usually amazement for most students in the class. The workshop will be based upon an article I published in 1996 in the journal *Teaching Philosophy* titled "Teaching Wittgenstein's Later Philosophy: Noticing What Is Always Before One's Eyes."

### BIOSKETCH

Gene Troxell is emeritus professor of philosophy at San Diego State University, where he taught for 34 years before retiring in 2000. His major philosophic interests are in the later philosophy of Wittgenstein, and ethics, particularly environmental ethics, and during the last 20 years or so of teaching he specialized in teaching courses in environmental ethics.

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## HOW THE COURSE OF HUMAN CIVILIZATION HAS BEEN SHAPED BY GEOLOGICAL EVENTS

Wednesday, 2:50pm–3:50pm, Marshman

**Michael Wyession**

### ABSTRACT

The co-investigations of anthropology and geology have found that our cultural history has been dramatically shaped by geological events, both gradual and catastrophic. These natural forces have long been omitted from accounts of human history, but are now beginning to be understood. The French Revolution occurred because volcanoes in Japan and Iceland caused catastrophic crop failures throughout Europe, where a dozen governments collapsed because of starvation and social unrest. Climate change in the 1300s caused extreme flooding in China, which set off a chain of events that led to the spread of the bubonic plague across Eurasia. The sudden flooding of what is now the Baltic Sea caused a rapid migration of peoples southward into the Middle East, forcing a complex series of migrations and conflicts that form much of the stories of the Judeo-Christian Old Testament. This discussion will have a broad appeal, incorporating contributions from many different disciplines.

### BIOSKETCH

See the biosketch on page 10.

## OTHER ACTIVITIES

### CENTERING PRAYER

Every day from Sunday through Friday,  
7:30am–8:00am, all in Marshman

**Marlene Laurendeau**

#### DESCRIPTION

Centering Prayer is a method designed to facilitate the development of contemplative prayer. Contemplative prayer is the opening of mind and heart—our whole being—to God, the Ultimate Mystery, beyond thoughts, words, and emotions. We open our awareness to God, whom we know by faith is within us, closer than breathing, closer than thinking, closer than choosing, closer than consciousness itself. Contemplative prayer can lead to divine union. Daily weekday sessions will incorporate four simple guidelines practiced during 20 minutes of silence. Although this prayer style has ancient Christian origins, the time of silence can also be used for meditation of any style or tradition.

Participants are encouraged to bring pillows for floor-sitting, though chairs will also be available.

#### BIOSKETCH

Marlene Laurendeau received a Diploma in the Art of Spiritual Direction from San Francisco Theological Seminary in 2005 and has been a practicing spiritual director for three years. She is also a clinical social worker, most recently in hospice care. She and her husband Norm recently moved to Maine from their Indiana home of 34 years.

### NEW IMAGES FROM THE ART BARN

Every day from Sunday through Friday,  
2:00pm–5:00pm, all in the Art Barn

**Gill Page**

#### DESCRIPTION

All are most welcome to come and sketch, draw, or paint, independently or joining others in a quest to make new images. By looking closely at the art elements of shape, texture, line, tone, and color, we will integrate these with words or numbers. In the process, we will create mobiles, montages, and paper patterns, while pondering what emergence means to the artist. The consecutive lessons are 2–5 P.M. daily. Sunday: SHAPE: We'll make them on the beach, record them in notebooks, and return to the Art Barn to work. Monday: Mobiles, a Balancing Act. We'll add LINE to shapes and need every moment. Tuesday: Circles and Squares, Words and Numbers, Converge, Emerge. We'll add TEXTURE to our work. Wednesday: Montage, TONES and COLOR monochromatic or mix and match, a very full three hours. Thursday: Notebook to Book. an Emergence to

a portfolio of new images. Friday: Finishing and Showing. a Clothesline Celebration. Artworks on view, still life for artists to draw, always available. Come and Enjoy!

#### BIOSKETCH

Gill graduated from Vassar with a BA and later from the University of Southern Maine with a BS in Art Education. I have taught K–12<sup>th</sup> grade art in both public and private schools and gave two workshops at Star for the International Studies Week. In 2002 I joined Lyman in Haiti for a week offering art in a church school there. I've exhibited in Boston at the Prudential Building, the Copley Society, the New England Aquarium, and the Science Museum, as well as at an American Artists Exhibit, all sculpture. Now I'm a docent at the Portland Museum of Art in Maine and exhibit in a local gallery.

### FLOW YOGA IN MOTION

Every day from Sunday through Friday,  
6:30am–7:45am and 5:15pm–6:15pm,  
all in Brookfield

**Bob Vaccaro RYT**

#### DESCRIPTION

Each class provides a meditative breathing practice and balanced workout that will strengthen muscles, release tensions, calm minds, and nurture spirits. Beginners are always welcome and are encouraged to work each posture at the optimum level where release is happening without strain.

#### BIOSKETCH

Bob Vaccaro has been practicing yoga for over 20 years and has been teaching yoga for over ten years. He holds certifications as a Psychosynthesis (spiritual psychology) Counselor, a Holistic Lifestyle Teacher, an Advanced Phoenix Rising Yoga Therapy Practitioner, an Integral Yoga Teacher, and a Yogassage Practitioner.



## CHAPEL AND CANDLELIGHT SERVICES AND CHOIR

Activities of the day begin right after breakfast each morning with chapel. Scheduled activities of the day end with a candlelight service.

### CHAPEL SERVICES

9–9:45 A.M.

**George Fisher** and **Gretchen van Utt** will be the chapel speakers on emergence in religious thought.

**George Fisher** has been at Johns Hopkins University since 1966, and is now emeritus professor of geology. He continues to teach courses on evolution, natural theology, and sustainability at both Johns Hopkins and St Mary's Seminary and University, also in Baltimore. He studied geology at Dartmouth College (BA, 1959) and at Johns Hopkins (PhD, 1963), and theology at St Mary's (MA, 2002).

**Gretchen van Utt** is a Presbyterian pastor (P.C.U.S.A), and currently serves as interim pastor at Harundale Presbyterian Church, in Glen Burnie, MD. She has served as chaplain at Johns Hopkins University and Goucher College, and as pastor at several churches in the Baltimore Presbytery. She studied at Kirkland College (BA, 1973) and Harvard Divinity School (MDiv, 1976).

### THE IRAS CHOIR

The IRAS Choir meets to rehearse Sunday through Friday immediately after lunch in the Pink Parlor [off the main lobby] and as otherwise announced. The choir is a lively and enthusiastic group of conferees, and looks forward to preparing music for the closing banquet, the talent show, and a chapel service. All singers are warmly encouraged! Accomplished instrumentalists are welcomed with open arms! Speak to Jane Penfield if you are interested but have doubts, and she will persuade you that they are misplaced.

**Jane Penfield** is executive director of CONCORA, a professional choir based in the Hartford, CT area. She also directs the youth choir at St John's Episcopal Church, West Hartford. She studied music at Mount Holyoke College (BA, 1976) and choral conducting at The Hartt School (MM, 1993).

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### CANDLELIGHT SERVICES

9:40–10:10 P.M.

- Saturday: **Ruth Bruns & Clarise Patton:** "Island Words and Music"  
Sunday: **Bob Mc Cue:** "Conscious Community"  
Monday: **Frank Thoms:** "Meditating on Emergence"  
Tuesday: **Stacey Ake:** "In The Fullness of Time"  
Wednesday: **Roger Brown:** "Re-Emergence"  
Thursday: **Cynthia Kelly & Muriel Blaisdell:** "Oceanic Feeling and the Sense of Wonder"  
Friday: **Jerome Stone:** "A Vocabulary of Reverence"

There will be changes in the use of the chapel this summer. The fire marshal in Rye has limited occupancy to 50 persons. We are all working very hard on making a "Best Plan" to deal with this. We may need to meet at least some of the time in Newton.

Coordinator: **Betty Lau**

# PEOPLE

## Conference Planning Committee

George Fisher	Cochair
Ursula Goodenough	Cochair
Nancy Anschuetz, Jeffrey Dahms, Terrence Deacon, Ted Laurenson	

## Conference Administrators

Conference Coordinator	Nancy Anschuetz
Registrar	Bonnie Falla

## Conference Facilitators

Announcements	Ruth Bruns
Book Table	Joan Goodwin
Bookstore Order	Ursula Goodenough
Candlelight Coordinator	Betty Lau
Children's Program Coordinator	Sandra Woodworth
IRAS Seminar	Michael Cavanaugh
Memorial Service	Ursula Goodenough
Music Director	Jane Penfield
Other Music	Frank Toppa
Program Book (Orange Book)	Doug Burton, David Klotz
Social Hour Coordinator	Veronique Blanchard
Star Beacon Editor	Jane Bengtson
Star Beacon Production Manager	Andrew Millard
Talent Show	Joan Hunter
Workshop Coordinator	Andrew Millard

Many other facilitators are recruited on the Island. A more complete list will be prepared for the banquet program pamphlet. The successful functioning of the conference is utterly dependent on the facilitators. If you would like to become involved in the functioning of the conference and meet and work with new and old friends, the conference chairpersons and coordinator, choir director, and *Star Beacon* editor and production manager would love to hear from you.

## Scholars and Fellows

IRAS Scholars: Whitney Bauman, Steven Gaudet, James Haag, Nancy Hutton, Katherine Peil, Joshua Reeves

Griswold Scholars: E. Maynard Moore, Virginia Leopold

Sturges Music Fellows: Lauren Avery, Thomas Goodenough Heuser

## IRAS Officers

John Teske	President
Michael Cavanaugh	Immediate Past President
Carol Albright	Vice President, Religion
Solomon Katz	Vice President, Science
Willem Drees	Vice President, Interdisciplinary Affairs
Karl Peters	Vice President, Conferences
Ursula Goodenough	Vice President, Development
Edwin C. Laurenson	Secretary
Marion Griswold	Treasurer

## Elected Council Members

Stacey Ake	Jeanie Graustein
Carol Albright	Sol Katz
Muriel Blaisdell	David Klotz
Donald Braxton	Andrew Millard
Jack Dennis	Lyman Page
Willem Drees	Edmund Robinson
George Fisher	Elizabeth White
Joan Goodwin	

## Other Council Members (Ex Officio)

Philip Hefner	Zygon Editor
Karl Peters	CASIRAS Representative
Nancy Anschuetz	Conference Coordinator

## Others with Official Responsibilities

Marjorie Davis	Historian / Parliamentarian
David Klotz	Membership Coordinator
Jack Dennis	Newsletter Editor
David Klotz	Newsletter Production Manager
Doug Burton	Webmaster
V.V. Raman	Discussion Groups Coordinator

## Honorary Officers

Donald Harrington	Honorary Vice President
Philip Hefner	Honorary Vice President
Karl Peters	Honorary Vice President
Solomon Katz	Honorary Vice President

## Committee Chairs

Archives	Marjorie Davis
Awards	Ursula Goodenough
Development	Ursula Goodenough
Finance	Norman Richardson
Interest Group	John Teske
Internet	Doug Burton
Long-Range Conf. Planning	Karl Peters
Membership	David Klotz
Newsletter	Ted Laurenson
Nominating	Edmund Robinson
Publicity	Marlene Laurendeau
Scholarship	William Falla

## READING LIST

*Note:* A far longer booklist, previously sent to conference registrants, can be obtained by request to ursula@biology.wustl.edu.

- Berry, Thomas. 1990. *Dream of the Earth*. Sierra Club Books.
- Brueggemann, Walter. 2003. *The Land: Place as Gift, Promise, and Challenge in Biblical Faith*. 2nd ed. Fortress Press.
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We are also thankful for our conferees, those who coordinate and volunteer for particular activities and all who participate in so many ways. We appreciate all the wonderful ideas and suggestions contributed, both those we were able to incorporate into the conference and those we could not.

We are grateful to the Isles of Shoals Association, Unitarian Universalist, for their grant. This has funded art-supply expenses, enabling our Art Barn program for the week.

We express our appreciation to the Star Island staff for the competent, courteous, and efficient way they take care of our needs and help make our week on the Island so rewarding. Special thanks also to the Star Island Corporation staff for all they do to keep this splendid facility available for our conferences.

# Annual IRAS Conference Saturday, July 29 thru Friday, August 4, 2006

PERIOD	ACTIVITY	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
<b>Morning Activities: Chapel and Plenary Lectures</b>								
8:00–9:00 A.M.	Breakfast <sup>9</sup>							
9:00–9:45 A.M.	Chapel							
10:00–10:55 A.M.	Lectures (El)	WELCOME TO STAR ISLAND	Stuart Kauffman	Michael Wyssession	Gordon Kaufman	Terry Deacon	Guy Hoelzer	All-Conference Discussion Jeremy Sherman
10:55–11:15 A.M.	Break							
11:15–12:15 P.M.	Discussion							
12:30–1:30 P.M.	Lunch							
<b>Afternoon Activities: Recreation<sup>2</sup>, Seminar, Workshops, Free University<sup>3</sup>, and Socializing</b>								
1:40–2:40 P.M. <sup>10, 11</sup>	Free University IRAS Seminar Annual Meeting	ARRIVING, GETTING SETTLED, GREETING FRIENDS, EXPLORING		IRAS Seminar (Ma)	IRAS Seminar (Ma)	IRAS Seminar (Ma)	IRAS Annual Meeting (El)	
2:50–3:50 P.M. <sup>10</sup>	Session I Workshops		Blaisdell (Nf) Fisher (El) Houk (Ma) Moore (PP) Robinson (Sp)	Cashman (Sp) Josties (PP) Sgorbati (El) Solomon (Nf) Stone (Ma)	Ake (El) Moore (PP) Morgan (Nf) Robinson (Sp) Stone (Ma)	Cashman (Sp) Teske (El) Thoms (PP) Troxell (Nf) Wyssession (Ma)	Council Meeting (Sp) Carr (Nf) Moore (PP) Shoemaker (El)	
4:00–5:00 P.M. <sup>10</sup>	Session II Workshops	MANDATORY STAR ISLAND ORIENTATION— 4:30 <sup>4</sup> PARENTS' MEETING— 5:15 <sup>5</sup>	Ball (Nf) Braxton (El) Goodenough & Goodwin (Sp) Houk (cont'd) (Ma) Josties (PP)	Blaisdell (Nf) Cashman (cont'd) (Sp) Lowry (Ma) Schaible (PP) Sgorbati (cont'd) (El)	Ake (cont'd) (El) Cavanaugh (Sp) Gillette (Ma) McCue (Nf) Schaible (PP)	Cashman (cont'd) (Sp) Koeninger (Br) Page/Braxton (El) Schaible (PP) Shoemaker (cont'd) (El) Smail (Nf)		
5:30–6:30 P.M.	Happy Hour <sup>9, 12</sup> (Newton)							
6:30–7:30 P.M.	Dinner					Lobster Dinner <sup>6</sup>		Banquet
<b>Evening Activities: Plenary Lectures, Candlelight Services, and Late Evening Activities</b>								
7:30–9:30 P.M.	Lectures and Discussion	Loyal Rue	Michael Silberstein	Bruce Weber	Ursula Goodenough	Barbara Smuts	Tucker/Swimme Pelican Show <sup>7</sup>	Talent Show
9:40–10:10 P.M.	Candlelight Services (Ch)	Ruth Bruns & Clarise Patton	Bob McCue	Frank Thoms	Stacey Ake	Roger Brown	Cynthia Kelly & Muriel Blaisdell	Jerome Stone
10:10 P.M.–?					<b>Movies, Snacks, Conversations, Dancing, and Socializing<sup>8</sup></b>			Farewell Party (Newton)

<sup>1</sup> Room abbreviations: **Br** = Brookfield; **Ch** = Chapel; **El** = Elliott; **Lw** = Lawrence; **Ma** = Marshman; **Nb** = Newton back; **Nf** = Newton front; **Pk** = Parker; **PP** = Pink Parlor; **Sp** = Sandpiper; **WR** = Writing Room.

<sup>2</sup> There will be an excursion to Appledore Island on Tuesday afternoon. Please sign up on Sunday or Monday.

<sup>3</sup> Free University and other activities organized by conferees will be announced on the Island and scheduled for the 1:40 to 2:40 P.M. period.

<sup>4</sup> The Star Island Orientation, conducted by the Star Island staff starting at 4:30 P.M., is the one and only scheduled activity that is mandatory for all conferees.

<sup>5</sup> All parents with children in the Archipelago program, and their children, are required to attend a brief meeting at 5:15 P.M. in Elliott.

<sup>6</sup> There will be a lobster dinner on Wednesday. Tickets must be purchased by Monday noon. **Lobster diners should be seated by 6:15 P.M.**

<sup>7</sup> On Thursday evening the plenary session discussion ends at 8:55 P.M., the Pelican show starts at 9:05 P.M., and the Candlelight Service begins as soon as the Pelican Show is over.

<sup>8</sup> Movies (when scheduled and as announced in the Star Beacon) will be shown in Elliott. The snack bar closes at 11 P.M. Socializing and informal discussions can continue until dawn.

<sup>9</sup> Yoga will take place Sunday-Friday 6:30–7:45 A.M. and 5:15–6:15 P.M. in Brookfield; “Centering Prayer” 7:30–8:00 A.M. Sunday through Friday in Marshman.

<sup>10</sup> New Images from the Art Barn” from 2:00–5:00 P.M. Sunday through Friday at the Art Barn.

<sup>11</sup> The IRAS Choir rehearses in the Pink Parlor Sunday through Friday from 1:15–2:30 P.M.

<sup>12</sup> New Hampshire law prohibits persons under age 21 from attending Happy Hour.