



# NASA ASTROBIOLOGY INSTITUTE ANNUAL REPORT YEAR [July 2002 - June 2003]



Virtual Institute: Virtual Institute

## **CONTINUED EVOLUTION OF THE VIRTUAL INSTITUTE**

Members of the NAI community, including Associates and Affiliates, are situated at well over one hundred universities, research institutions and NASA Centers across the country and around the globe. Each NAI Team includes people not only from the Lead institutional site, but from a number of other locations as well. NAI members also come from many different research disciplines, representing the wide range of disciplinary expertise important to astrobiological exploration. Thus the NAI community exists as diverse and distributed group. This "virtual institute" is thus challenged to promote collaboration across geographical distances, scholarly disciplines, and institutional boundaries.

NAI's intent as a virtual institute is to catalyze and facilitate knowledge sharing and collaboration:

- among researchers within and across NAI Lead Teams
- with members of the larger astrobiology community
- with interested members of the public,

for the purposes of furthering astrobiology research, supporting the development of astrobiology as an important new field of science, and helping to shape and inform the scientific goals of NASA missions.

To implement this intention, NAI actively supports the development of a shared *culture of collaboration*. Important institutional culture goals include the identification and promotion of those social values and behaviors and the provision of those communication/collaboration tools that enable members to engage in: "easy collaboration from anywhere, anytime, with anyone". Such a culture of collaboration is something that evolves over time, shaped by shared experiences and the emergence of common goals and practices, as well as on-going member participation and feedback.

### **Overview of This Year's Projects**

During this past year several projects were carried out to further the development of NAI as an effective virtual institute. Some had been initiated in previous years, but reached a new level of maturity and robustness during this fifth year of NAI's existence. Others represent new initiatives.

- NAI Seminar Series

- Other Virtual Classes, Seminars, Discussion Groups
- WebEx ? a synchronous meeting tool
- LiveLink ? a knowledge management/collaborative work space tool
- A Virtual Institute Component at the NAI Annual Meeting

#### Developmental Approach to the Virtual Institute

Before discussing the specifics of this year's projects it is worthwhile to briefly review the developmental approach that we are taking to make the concept of the virtual institute a successful reality. A four phase design cycle is guiding this process. The first phase, which was completed in 2002, was one of discovery, with the intention of identifying NAI members' needs regarding their scientific collaborations and their expectations regarding benefits and opportunities associated with membership in the virtual institute. Interviews with many members and a community-wide survey provided data for the NAI Communication/Collaboration Needs Assessment document.

Foremost among identified needs was a desktop solution to both real-time meetings with distributed colleagues, and asynchronous collaboration opportunities where colleagues could share and store work in a secure web-based environment. These and other member identified needs guided the next two phases of development of the institute's technology architecture, which occurred during the latter half of 2002 and the first quarter of 2003. These included research on and demonstrations of collaboration tools of potential interest to NAI, given assessed needs. WebEx, a collaboration tool supporting real-time meetings was selected first, with a pilot project launched in November of 2002 and completed in May, 2003. Livelink, a knowledge management/information repository tool was then selected, with a pilot launched in July of 2003. These pilots are discussed in greater detail below. The fourth phase in our developmental cycle, full-scale deployment of new collaboration practices or tools to the entire NAI community, is now underway with WebEx.

The developmental process is of course cyclical, not linear. With the shift in NAI membership, the inclusion of six new teams and the reconfiguration in many instances of the six NAI teams that were reselected in the recent CAN, it is important to reassess member needs, as well as the overall developmental direction of the virtual institute. That will be an important aspect of our work in the next year.

In our reassessment we will continue to be guided by a focus on three distinct NAI arenas in which communication and collaboration need to be supported. These include

#### 1. Lead institutional site to Lead institutional site:

enabling one-to-one and multi-site videoconferencing, data sharing, knowledge building and other collaborative work among PIs, CO-Is,

Post-Doctoral Fellows and other team members located at the Lead institutional sites.

2. Distributed teams/Focus Groups/small group collaborations:

enabling videoconferencing, data sharing, knowledge building and other collaborative work among NAI members who do not reside at Lead institutional sites as well as people at Lead sites who want to engage from the desktop rather than the conference room, and/or who want to collaborate with colleagues who are not at other Lead institutions.

3. NAI community-wide events, conferences, seminars:

enabling large groups of people at different geographical locations to meet together virtually for presentations and exchanges of various kinds. These groups may also include the larger Astrobiology community beyond the NAI itself, and/or interested members of the public.

Specific Projects

• ***NAI Video Seminar Series***

Director's Seminar Series

Launched in 2002, these monthly video seminars have become a regular event in the virtual institute calendar, drawing participants from many NAI teams, as well as open to others from the larger scientific and public communities. The seminars are hosted by one of the NAI Lead institutional sites. They are both webcast via the Internet and broadcast out to meeting rooms and/or desktops at other sites via the Polycom videoconferencing system. Slides and other documents or images are shared with the distributed audience using the WebEx meeting tool. WebEx also includes a chat feature that has been used to facilitate exchange between presenter and remote audience members.

The following seminars were offered in Year Five:

8/25/03 Linda Amaral Zettler – MBL

"Eukaryotes at pH Extremes"

7/28/03 Jim Tiedje – MSU

"Microbial and Genomic Insights In Microbial Life in Permafrost"

6/23/03 Jose Maria Gomez, David Hochberg – CAB

"Multicellular and Multicolonial Bacterial Patterns: Implications for Astrobiology"

5/19/03 John Bally – CUB

"Star and Planet Formation"

4/28/03 Anurag Sharma – CIW

"Experimental Window into High Pressure Geobiology"

3/24/03 Tom Quinn – UOW

"The Formation of Giant Planets"

2/24/03 David Smith – URI

"Probing the Limits of Earth's Deep Biosphere "

11/25/02 Bruce Runnegar – UCLA

"Sulfur Cycling on the Early Earth"

10/28/02 Michael Storrie–Lombardo – VPL

"Life Detection and Sensors:Bio–Info–Nano Science"

The Forum for Astrobiology Research Seminar Series

This monthly video seminar series, piloted last year, was fully launched early in 2003. The seminars feature presentations by NAI Post–Doctoral Fellows, as well as astrobiology graduate and undergraduate students drawn from NAI Lead Teams.

These forums have also become well attended monthly events, and have promoted dialogue and professional networking among NAI community members.

The following seminars were given during this past year:

9/8/03 Sara Martinez – CUB

"Looking for Hydrothermal Systems on Mars: An Integrated Study of Spectroscopic, Thermal, and Imaging Data"

7/14/03 Kevin Boyce – HAR

"How to Make a Leaf? 400 Million Years of Repeated Answers to the Same Evolutionary Question"

6/9/03 Ruth Ley – CUB

"The Amazon Basin of the Mud World: Dizzying Microbial Diversity at Guerrero Negro's Salt Mats"

5/12/03 Henry Scott ? CIW

"Chemical Stratification and Hydrocarbon Stability in Large Icy Satellites"

4/14/03 Michelle Minitti

"Assessing the Effect of Impact Shock on Water in Amphibole: Implications for the Martian Meteorites"

3/10/03 Alex Pavlov – CUB

"Atmospheric Methane and Oxygen in Archean and Proterozoic. Constraints from Sulfur"

- ***Other Virtual Classes, Special Seminars, Discussion Groups***

- NAI Special Seminar

In addition to the two regularly scheduled NAI Seminar Series, occasional Special Seminars are also offered. In Year Five the following special event was implemented:

11/1/02 Peter Jenniskens – ARC

"An Astrobiology Mission to Explore the 2002 Leonid Storm"

- University of Washington Astrobiology Seminar Series

During this last year Tom Quinn of the UOW Lead Team proposed that NAI broadcast the presentations given in the UOW weekly Astrobiology series. Other sites were able to view the seminars in real-time, either in their conference rooms or individually at the desktop through a webcast. These seminars drew on a number of scientists associated with other NAI teams, and offered NAI members and others yet another opportunity for the knowledge sharing and exchange that the virtual institute aims to foster. Presenters for the Spring quarter, 2003, are listed below.

5/27/03 Robert Blankenship

"The Transition from Anoxygenic to Oxygenic Photosynthesis and How it Changed the Earth"

5/20/03 Roger Buick

"A Subsurface Biota in the Archean?"

4/29/03 Tori Hoehler

"Energetic Habitability: Boundary Conditions for Life—as–We–Know–It"

4/22/03 Jack Farmer

"Microbial Biosedimentology of some Extreme Terrestrial Environments with Implications for the Exploration for Extraterrestrial Life"

4/15/03 Geoff Garrison

"Geochemical Seasonality in a Unique Aquatic Environment: Who Needs

Oxygen, Anyway?

- Pennsylvania State University Astrobiology Seminar Series

In the Fall semester of 2002, members of the PSU Lead Team collaborated with colleagues at the University of Pittsburgh and the State University of New York at Stony Brook on a for credit course open to students from all three institutions. and presented through a "virtual classroom". Using PolyCom cameras provided by NAI to all three sites, a "virtual classroom" was created, which allowed three way engage among students and faculty from each site. This experiment in distance learning was extremely well received by participants at all three sites and a commitment has been made to continue this seminar offering in the Fall of 2003.

- ***WebEx ? a synchronous meeting tool***

Extensive research was conducted on commercially available real-time meeting tools, to identify best solutions for NAI. Given the all important NAI requirement of cross-platform compatibility for all desktop solutions, as well as other features, we selected WebEx for a 6 month pilot project. The pilot began in early November, 2002, and ended in early May of 2003. We introduced the use of WebEx into the monthly Executive Council videoconferences and the two NAI Seminar Series. A number of small project groups also tried out WebEx for their meetings during the pilot period.

Based on overwhelmingly positive feedback by those who utilized the tool during the pilot phase, we chose to continue WebEx for an 12 months more months, with additional options to extend our use for 12 months at a time. NAI members have found WebEx useful various types of meeting that involve more than voice only exchange. The software enables meeting participants to engage in data, document and application sharing from their desktops, as we;; as draw or take notes in real time on a whiteboard, create and implement polls, and chat privately with selected individuals, or with the whole group, attending the meeting, WebEx is now available for use by any NAI member who wishes to hold a meeting with colleagues on NAI-related matters.

- ***LiveLink ? a knowledge management collaborative work space tool***

Research was also undertaken on collaboration tools that support document management, information sharing and storing, and secure collaborative workspaces. This category of tool is generally referred to as a knowledge management tool. Among those who research virtual organizations, it is generally regarded as a best practice that such organizations make some kind of share information repository and collaborative work space available to all its members. Such a virtual space facilitates document and data exchange, knowledge sharing and building and collaborative work projects.

After a close look at several strong candidates, we selected Livelink for a 7 month pilot by 100 users drawn from the NAI community. This pilot was launched in July 2003, and runs through February 2004.

Small groups of scientific collaborators from as many of the NAI lead teams as are interested, are being sought for participation in the Livelink pilot, as well as user groups from NAI Central and the IT Working Group. Hands-on evaluation of the tool by the NAI Central group. And feedback from pilot participants will determine whether we proceed with a licensing agreement to provide full deployment to all members of the NAI community.

- ***A Virtual Institute Component at the NAI Annual Meeting***

The Program Planning Committee for the NAI General Meeting held in February, 2003, determined that focus on the virtual institute concept and its implementation should be a part of the conference. As a result, several projects and events were undertaken.

The virtual institute was included for the first time as a category for poster submissions. Several members of the IT Working Group, and several NAI Central staff, as well as others, submitted proposals in the category and were invited to present posters. Posters included a general focus on virtual institute issues, such as the meaning of NAI membership, or the social and technical challenges of the virtual institute. Other posters presented projects undertaken by members of specific Lead Teams, such as the virtual classroom explored by PSU, data sharing tools linking the science laboratories of the MSU researchers, a wireless data sharing system for remote fieldworkers designed by members of the MBL Team, and an interactive portal interface designed by CIW Team members.

A special room was designated as a hands-on demonstration space for collaboration tools currently being offered to NAI members or explored by the NAI IT Working Group. Specific demonstration events were scheduled, and the room was also available for drop in visits by conference attendees interested in trying out tools or getting some personal coaching.

Finally, a Town Meeting was scheduled on the final day of the conference, and part of the discussion was focused on the virtual institute and its benefits and challenges to members. This was the first time a public forum with NAI had taken up this topic, and useful feedback as well as creative ideas emerged from this meeting.