

NESCent



National Evolutionary Synthesis Center
2013 ANNUAL REPORT

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DIRECTOR'S MESSAGE

Over the last few years, we have tried to understand how we can measure and demonstrate NESCent's value. This is related to, but is not the same as, the value of synthetic research itself, although quantifying that, too, remains a challenge. If we think of NESCent, for instance, we can certainly recite facts and figures:

- NESCent has had more than 5000 visitors over the life of the Center
- Publications that have emerged as a consequence of NESCent's activities have been cited more than 13,000 times
- Our h-index is 57, up from 27 in 2010
- NESCent participants have secured more than US\$27M in grant funding as a consequence of their participation in NESCent-sponsored activities. Additionally, NESCent staff have accumulated more than US\$10M in grant funding, to make a total of US\$37M, a return that is almost equal to the NSF grant for the Center itself
- Faculty at the institutions that support NESCent – Duke University, the North Carolina State University, and the University of North Carolina at Chapel Hill – have participated in close to a third of all Working Groups and Catalysis Meetings, and are authors on more than 7% of the publications that have emerged.



These are great statistics but, in my opinion, they don't capture the essential value of the Center. For me, that value sits elsewhere. I attended a NESCent seminar last week given by Alistair Sponsel of Vanderbilt University entitled, "How studying the oceans launched Charles Darwin's scientific career." Alistair is a historian of science who started out as a biologist. It was fascinating to hear how historians study the development of ideas, and it was enlightening to contrast this with how scientists view the progress of science.

A few weeks earlier, we had Mark Moffett, who works with the National Museum of Natural History at the Smithsonian, talking about shifts in social identity and recognition, and how these play a role in the emergence of very large societies. Again, an illuminating exposition of when it is important to know who one's neighbor is and when it is important to know simply that another individual is part of the same group.

We routinely have talks like these, usually before an audience of graduate students, postdoctoral fellows and faculty, many of whom would not otherwise be exposed to such disciplinary breadth in a typical university department. This, I think, is the essence of a synthesis center: when it works well, it is a place where disciplines and ideas collide to ignite the intellectual sparks that light up the hard-to-see places where elusive truths hide. This happens not just at talks, but at meetings, journal clubs, afternoon teas, in corridors, and – yes – sometimes in restrooms.

It is difficult to convey the experience of a synthesis center in dry-as-dust assessment reports and statistical analyses. It is equally difficult to do so in an annual report. When you read this, then, consider what we have left unsaid: think of what it means to be at a Center where you can talk to an artist one day, a journalist the next, and a historian the day after that.

Allen Rodrigo
24 September 2010

>5000: number of visitors to NESCent since the center's beginnings in 2004

US\$27M: additional grant funding awarded to scientists as a direct result of their participation in NESCent-sponsored activities

Additional grant funding awarded to NESCent staff above and beyond NSF funding: **US \$10M**

140%: return on investment for NESCent-sponsored activities

>500: papers published by NESCent participants as a result of NESCent support

>13,000: number of times NESCent's 500+ publications have been cited, as of September 2013

1/3: fraction of Working Groups and Catalysis Meetings with faculty participation from the institutions that support NESCent—Duke University, the North Carolina State University, and the University of North Carolina at Chapel Hill

We host more than **600** scholars each year, as much as 30% of which have been from outside the U.S.

622 people attended meetings or workshops at NESCent in 2013

32 scientific meetings were held at NESCent in 2013





EXECUTIVE SUMMARY

In 2013, one of the main areas of focus for NESCent was sustainability and transition. Earlier this year, the Provosts of Duke University, North Carolina State University and the University of North Carolina at Chapel Hill met with the NSF site visit panel at NESCent and subsequently encouraged us to submit a proposal continuing a science synthesis center. The final version of the proposal was delivered to the Provosts in mid-October 2013. We have also had success securing funds from foundations and federal funding agencies to support a variety of activities at NESCent.

December 2013: last deadline for Catalysis Meeting and Sabbatical Scholar proposals

January 2014: last deadline for Graduate Fellowship proposals

Short-term Visitor proposals accepted through **April 2014**

Given that NSF funding formally ends in November 2014, December 2013 will be the last deadline for Catalysis Meeting and Sabbatical Scholar proposals. Similarly, the last Graduate Fellowship proposal deadline will be in January 2014. We will continue to accept Short-term Visitor proposals at least until April 2014. All meetings and times of residence are expected to be completed by November 2014.

In addition to a full schedule of meetings and courses, NESCent will be organizing Evolution 2014, the annual joint conference of the Society for the Study of Evolution (SSE), the Society for Systematic Biology (SSB), and the American Society of Naturalists (ASN). The conference will be held in Raleigh from June 20 to 24, in conjunction with the satellite iEvoBio conference (June 24 to 25).

Much of the science done at NESCent continues to have a high impact within the scientific community. This is evident in the quality of NESCent's publication output; the center's h-index (a metric reflecting both publication volume and citation frequency) is high, currently at 57. In 2013, NESCent supported 18 of 39 proposals for Working Groups, Catalysis Meetings, Sabbaticals and courses and 28 of 31 applications for Short-term Visits and Graduate Fellowships. As of September 15, 2013, NESCent had 622 participants at the center who attended 32 scientific meetings (21 Working Group meetings and 11 Catalysis Meetings), as well as several meetings by groups involved in evolutionary synthesis but that were not supported by NESCent funds. By the end of 2013, the center will have hosted 13 postdoctoral fellows, 5 sabbatical scholars, 1 Triangle research fellow, 10 short-term visitors, 6 graduate students, and several visiting and resident scientists.

Currently we have 45 meetings that are or will be scheduled between now and November 2014, in addition to 9 resident postdoctoral scholars and 5 resident sabbatarians. We will have no new incoming postdocs, but 6 of our current postdocs are likely to complete their full terms, and we have two sabbatarians who have just been awarded residency for 2014. We also plan one more round of applications for Catalysis Meetings and Sabbatical Scholars in February 2014, and we anticipate a continued set of robust applications for Short-term Visitors through November 2014.

◀ While you're in North Carolina for the Evolution 2014 conference, visit the Sylvan Heights Waterfowl Park, the largest bird park in North America. At left, a Black-Necked Stilt. PHOTOGRAPH BY FRANK SCHULENBURG, WIKIMEDIA COMMONS

“To ensure sustainability for key programs, NESCent has partnered with BEACON for the SACNAS conference and the NABT Evolution Symposium.”

INFORMATICS

Informatics has continued to serve the varied needs of sponsored science projects while helping build cyberinfrastructure capacity for the broader community. In 2013, NESCent and the “Synthesizing and databasing fossil calibrations” Working Group completed the Fossil Calibrations Database, which is scheduled for a public launch at the Society for Vertebrate Paleontology meeting in October 2013. Also, for the seventh year in a row, NESCent served as a Google Summer of Code mentoring organization and supported 7 student projects with an additional project sponsored through the GNOME Outreach Program for Women.

In 2013, NESCent made substantial progress on the Open Tree of Life (OToL), a collaborative project that aims to build a comprehensive evolutionary tree. More than 2,600 studies with more than 6,000 phylogenetic trees were added to the draft. NESCent also organized a well-attended Tree of Life Symposium at Evolution 2013. During this meeting, OToL circulated guidelines for NSF data management plans in systematics and phylogenetics to ensure future phylogenies are digitally available.

In 2014, the informatics team will undertake a comprehensive inventory of NESCent-generated data and software. We will ensure a plan for continued maintenance and hosting of online databases or, in the absence of viable options, we will work with scientists to archive their data. NESCent will conclude its custom support projects and showcase its accomplishments at Evolution 2014 through a sophisticated conference website and online program.

EDUCATION AND OUTREACH

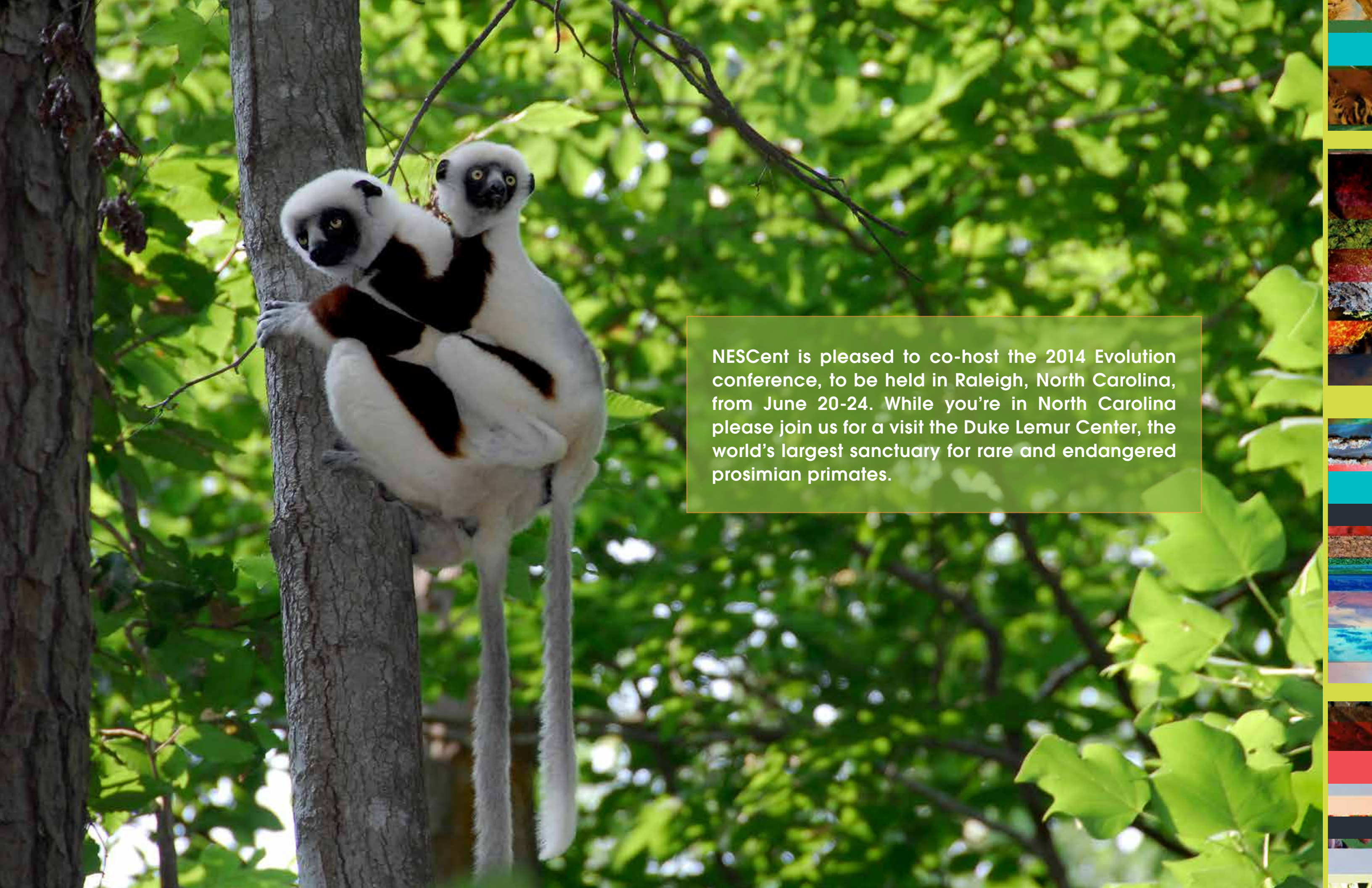
NESCent’s 2013 education and outreach efforts reflect the maturity and stability of activities that have been developed and implemented over the preceding eight years. Outreach to the education community continued through established NESCent programs including the Darwin Day Roadshow, annual NABT Evolution Symposium, teacher training workshops and our popular Evolution Video Contest. Seeing and Learning Science Afterschool (SALSA) continued and expanded in 2013. These workshops target underrepresented minorities and were delivered in English and Spanish; all modules are now available in both languages. NESCent also continued to organize and support the annual Society for Advancement of Chicanos and Native Americans in Science (SACNAS) conference.

Internationally, the NESCent Ambassador program returned to Belize and Bali and made an inaugural trip to Quito, Ecuador. The NESCent Ambassador program conducts short courses, workshops and teacher training in developing nations and to date, has visited eight countries spanning four continents. Closer to home, NESCent Academy and a weekly seminar series for in-house scientists and invited speakers served the local evolutionary science community. The highlight of our outreach efforts for the general public continued to be the annual Darwin Day event, which we cofounded and co-sponsor with the North Carolina Museum of Natural Sciences.

To ensure sustainability for key programs, NESCent has partnered with BEACON for the SACNAS conference and the NABT Evolution Symposium. Next year, we will continue established, successful programs while pursuing new funding opportunities and building partnerships to sustain these projects beyond 2014.

▲ Venus Flytrap, North Carolina native. PHOTO BY NOAH ELHARDT, WIKIMEDIA COMMONS





NESCent is pleased to co-host the 2014 Evolution conference, to be held in Raleigh, North Carolina, from June 20-24. While you're in North Carolina please join us for a visit the Duke Lemur Center, the world's largest sanctuary for rare and endangered prosimian primates.



“Our assessment continues to show that NESCent-supported research is having an impact. So far in 2013, our papers have accumulated 13,219 citations compared to the 8,220 citations at this time last year.”

COMMUNICATIONS

In 2013, communication at NESCent provided scientists with opportunities—both traditional and new—to share their research with a larger audience. In 2012-2013, NESCent-sponsored research was featured in more than 25 articles in mainstream media, including Science News, National Geographic, Science Magazine and Discover. We also distributed 11 news releases through an innovative news service, EurekAlert, which disseminates these releases to nearly 10,000 registered science reporters. In the past year, nearly 47,000 people in more than 170 countries visited the NESCent website. NESCent also jointly hosted a national science journalism conference at NC State’s Centennial Campus and hosted a Catalysis Meeting aimed at improving media coverage of scientific topics.

In its third year, the journalist-in-residence program welcomed Huffington Post staff journalist Rebecca Searles, DC-area freelancer Carrie Arnold and multimedia designer and artist Lynn Fellman. NESCent also sponsored a blog conference and a corresponding travel fellowship, which paid for two evolutionary science bloggers to attend ScienceOnline in North Carolina. For the upcoming year, we will make final calls for evolution blog contest entries and for journalist-in-residence proposals.

ASSESSMENT

NESCent’s ongoing assessment program reached another milestone with our second major assessment report. In an effort to secure funding for NESCent beyond November 2014, we have incorporated assessment metrics relevant to a variety of potential funders. The Science of Science program has continued to collect data on the process of collaboration among NESCent’s sponsored scientists. NESCent also supports (with NCEAS) and participates in a cross-center assessment working group, “Advancing Theory and Research on Scientific Synthesis.”

Our assessment continues to show that NESCent-supported research is having an impact. So far in 2013, our papers have accumulated 13,219 citations compared to the 8,220 citations at this time last year. We used ISI Web of Knowledge to analyze papers produced by top-ranking universities in scientific output and the 15 most prolific U.S. research institutions. The results showed that only three universities had a higher average citation rate than NESCent, demonstrating the far-reaching scope of the center’s publications.

In 2014, assessment will focus on function, productivity and marketability while continuing collaborations with the “Advancing Theory and Research of Scientific Synthesis” working group and publishing our results.

ADMINISTRATION

The primary focus of the past year’s administrative activities has been to increase efficiency, build better processes, review policies and prepare for the final center report. Catherine Craver replaced Phillip Grosshans as the Assistant Director for Research Administration in October, 2012. Mattison Ward who served as System Administrator departed in May, and David Palmer, who previously provided desktop and AV support at NESCent, was promoted to that role. NESCent was also pleased to welcome Mercedes Gosby, Dan Leehr and Jonathan Rees to the informatics staff. We also had a successful internal audit and received a stellar report with no issues reported and no responses required.

In addition to the Evolution 2014 conference, NESCent has a full roster of upcoming meetings and activities, as well as a still-active resident community. Regardless of whether we receive additional funding, NESCent staff will have to be prepared for a transition. Where appropriate, we will provide opportunities for professional development, including career counseling workshops and sessions.

Atrium robustum on *Siphonogorgia godeffroyi* (Soft tree coral) ►
PHOTO BY NICK HOBGOOD, WIKIMEDIA COMMONS



1. CENTER-WIDE ACTIVITIES

Collectively, there were three things on our minds this year. First, our push for sustainability ramped up, and meetings with colleagues and senior administrators at the three partner institutions have taken a significant turn, as has our engagement with foundations. Second, we began planning in earnest for Evolution 2014, the annual joint conference of the Societies for the Study of Evolution, the Society for Systematic Biology and the American Society of Naturalists. Finally, in the absence of any confirmed guarantees for the future, we began thinking about how our programs will wind down.

1.1 2013 Activities

1.1.1 Sustainability

Earlier this year, the Provosts of Duke University, The North Carolina State University and The University of North Carolina at Chapel Hill met with the NSF site visit panel at NESCent and were pleased to hear that NESCent continued to be valuable to the research community, locally, nationally and internationally. As a result of this meeting, the Provosts encouraged us to submit a proposal to continue the operations of an evolutionary synthesis center that would be supported by partner institutions. The center would focus on delivering benefits to the Triangle institutions, while still providing an avenue for national and international engagement in synthetic evolutionary research. We have developed a draft of the proposal and, at the time of writing, this is being circulated to colleagues and senior administrators for comment and discussion. The final proposal will be delivered to the Provosts in mid-October 2013.

We have also had success securing funds from foundations and federal funding agencies to support a variety of activities at NESCent. These include:

- NSF funding for an EvoDevo Catalysis Meeting surveying the past and present of evodevo research, and identifying an agenda for the future
- NSF supplement for a Women Evolving Biological Sciences meeting
- Sloan Foundation funding for a catalysis meeting and short-term visitors to explore the topic of the evolution of the fauna associated with buildings.
- Richard Lounsbery Foundation funding for NESCent and Encyclopedia of Life to collaborate on a Hack-A-Thon to create tools and examine biodiversity using Encyclopedia of Life and the Biodiversity Heritage Library.
- A subcontract on a NSF PIRE grant for continuation of a NESCent phylogenetics workshop at the Indonesian Biodiversity Research Center in Bali
- A tentative commitment from the Burroughs-Wellcome Trust to support a Catalysis Meeting, theme as yet undetermined

We plan to continue working with Foundations and other funding agencies to identify suitable sources of support for targeted NESCent programs.

1.1.2 Evolution 2014

NESCent is coordinating the organization of the Evolution 2014 conference. Duke University, East Carolina University, the North Carolina Museum of Natural Sciences, the North Carolina State University, the University of North Carolina at Chapel Hill and the University of the North Carolina at Greensboro are represented on the Organizing Committee.

The conference will be held in Raleigh, North Carolina, from June 20 – 24, in conjunction with the satellite iEvoBio conference (June 24 – 25). In addition to the usual program of symposia, presidential addresses, poster and parallel presentation sessions, there will be a special symposium celebrating 10 years of NESCent and its contribution to synthetic evolutionary science.

1.1.3 Plans for winding down

In the absence of a confirmed funding plan to sustain NESCent beyond 2014, prudence requires that we formulate and, in some cases, implement plans to suspend our operations until such time that there is certainty about our future. Our science program, for instance, no longer accepts proposals for working groups and postdoctoral scholars. Unless something changes, December 2013 will be the last deadline for Catalysis Meeting and Sabbatical Scholar proposals. Similarly, the last Graduate Fellowship proposal deadline will be in January 2014. We will continue to accept Short-term Visitor proposals at least until April 2014.

One way to keep valuable NESCent activities alive is to find partners who may be prepared to adopt these programs. The Education, Outreach and Communications group has already begun partnering with BEACON on two projects - symposia and workshops we organize and run yearly at



NESCent is pleased to co-host the 2014 Evolution conference, to be held in Raleigh, North Carolina, from June 20-24. While you're in North Carolina please join us for a visit to the Duke Lemur Center, the world's largest sanctuary for rare and endangered prosimian primates.

the NABT and SACNAS meetings. BEACON has expressed enthusiasm for assuming operation of these projects in the event of NESCent's cessation. We have also recently established a partnership with the NC Museum of Natural Sciences to jointly offer our annual summer workshop for high school teachers.

The Informatics staff is exploring an automatable mechanism to create a Virtual Machine (VM) image with the necessary software and scientist-generated content installed, which can then be archived to permanent media, and shipped to NESCent PI(s). In addition to preserving the content in the form of VMs, we expect to work with the respective scientists to identify low-cost or no-cost hosting providers to which the content could be migrated. Datasets created in the course of sponsored projects are to be archived for permanent preservation in a public digital data archive (such as Dryad). We will see that all software developed, whether by staff, contractors, or sponsored scientists, is made available with an open source license in a trusted software repository (e.g. GitHub). This includes administrative, assessment, and other software.

Finally, whereas we encourage grant-eligible research staff to apply for grants, we have routinely encouraged all staff to think about career development. We set aside funds for staff to attend training workshops, and we actively push staff to identify courses that would benefit their careers.

1.2 2014 Plans

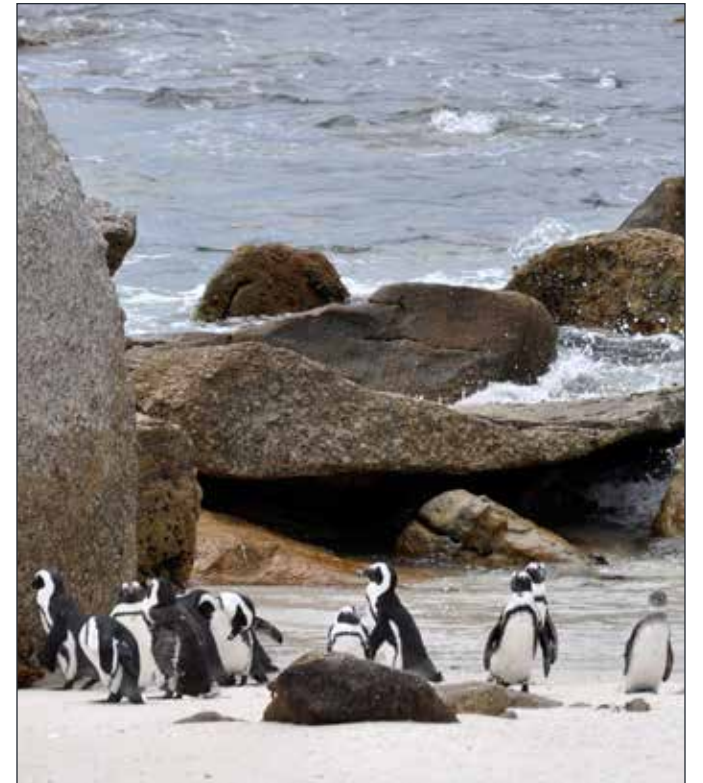
2014 will be a busy year for NESCent – in addition to a full schedule of meetings and courses, we will be organizing Evolution 2014. We will also be in transition: NESCent after 2014 will no longer be the same, and in the coming year we will implement and/or solidify the transition plans we outlined in the previous section.

2. SCIENCE AND SYNTHESIS

As we head into our final year of core NSF funding, we are proud to report that NESCent's science activities remain vibrant and continue to include a broad portfolio spanning a wide range of organisms, habitats, methods, and disciplines. Our core science programs – postdoctoral fellows, long-term and short-term visiting scholars, and teams of scientists we have supported in Working Groups and Catalysis Meetings – continue to enable NESCent-supported scientists to tackle many important evolutionary problems using synthetic methods. Our in-house community is a fertile environment for sustained research and allows diverse scientists to identify common interests and stimulate new collaborations.

Much of the science done at NESCent continues to have a high impact within the scientific community; NESCent is credited on well over 500 publications in leading journals and NESCent's h-index (a metric reflecting citation frequency) is high, currently at 57 (see "Assessment" section). In addition, NESCent's "news room" (see "Communications" section) continues to skillfully facilitate media outreach, with the result that NESCent science reaches the general public as well as the scientific community. The following are some examples of successful science stories – synopses can be found in Section 5:

- [Study examines how ocean energy impacts life in the deep sea](#) (September 2012) Featuring NESCent Assistant Director Craig McClain.
- [Fossil study helps pinpoint extinction risks for ocean animals](#) (October



NESCent researchers uncover Africa's oldest known penguins.
PHOTO BY DANIEL THOMAS

2012) Featuring the NESCent working group "Determinants of extinction in ancient and modern seas," organized by Paul Harnik. Picked up by *LiveScience*.

- [Model sheds light on the chemistry that sparked the origin of life](#) (November 2012) Featuring NESCent visitor Wim Hordijk.
- [Ethiopians and Tibetans thrive in thin air using similar physiology, but different genes](#) (December 2012) Featuring the NESCent working group "Human evolution and adaptation to high-altitude hypoxia," organized by Cynthia Beall and Peter Robbins. Picked up by *Futurity*.
- [The safer sex? For a little-known primate, a new understanding of why females outlive males](#) (February 2013) Featuring NESCent postdoc Jennifer Verdolin. Picked up by *Futurity*.
- [Uncovering Africa's oldest known penguins](#) (March 2013) Featuring NESCent postdoc Dan Ksepka. Picked up by *Discovery News*, *NBC news*, *Huffington Post*, *the UK Daily Mail* and *Scientific American*.
- [Study proposes alternative way to explain life's complexity](#) (April 2013) Featuring NESCent visitor Wim Hordijk. Picked up by *NSF*.
- [Small but speedy: Short plants live in the evolutionary fast lane](#) (May 2013) Featuring NESCent visitor Rob Lanfear.
- [Bird fossil sheds light on how swift and hummingbird flight came to be](#) (May 2013) Featuring NESCent postdoc Dan Ksepka. Picked up by *Science Magazine*, *Science News* and *Discover*.
- [Personality test finds some mouse lemurs shy, others bold](#) (June 2013) Featuring NESCent postdoc Jennifer Verdolin. Picked up by *Futurity*, *Audubon Magazine* and *National Geographic Magazine*.
- [Hot flashes? Thank evolution](#) (July 2013) Featuring NESCent Assoc. Director Susan Alberts. Picked up by *Science News*.

2.1 2013 Activities

In 2013, NESCent's Calls for Proposals attracted 39 proposals for Working Groups, Catalysis Meetings, Sabbaticals, or Courses. This represents a relative increase (although a smaller number) compared to the 41 proposals submitted in year 8 in these categories. In previous years we've always had two Calls for Proposals for in these categories (one in winter and one in summer), but in 2013 we made only one Call for Proposals for Working Groups, in winter, in anticipation of the end of our core funding. Of these 39 proposals, 18 were supported (see Appendices for summary).

We also attracted 31 applications for Short-term Visits and Graduate Fellowships in year 9 (up from 17 in year 7 and 26 in year 8). Of these 31, 28 have been supported – they were an unusually strong set of applications. The complete list of NESCent scientific projects funded in year 9 is given in the Appendices.

In the aggregate as of September 15th 2013, NESCent supported 32 scientific meetings in 2013 (21 Working Group meetings and 11 Catalysis meetings), involving 622 visitors. In addition we hosted several meetings not supported by NESCent funds, but involving evolutionary synthesis. A complete list of meetings at NESCent in year 9 is given in the Appendices.

2.1.1 The NESCent In-house Community and Postdoctoral Development

We have maintained a vibrant and collegial community of in-house scientists; in fact the in-house community has not, as yet, experienced any noticeable loss of membership or vitality as we head into our final year. During year 9, the Center will have hosted 13 postdoctoral fellows, 5 sabbatical scholars, 1 Triangle research fellow, 10 short-term visitors, 6 graduate students, and several visiting and resident scientists. Our weekly Brown Bag Lunch seminar series and Journal Club meetings remain lively touchstones for our resident community. As always, each postdoctoral fellow has a formal mentor (identified after an initial meeting with a mentoring committee to discuss the postdoctoral fellow's research plans, NESCent expectations, local and other resources) and has developed a written mentoring plan vetted by the NESCent mentor and the Associate and Assistant Directors of Science.

In addition, we run a postdoctoral professional development program that, in 2013, includes the Postdoctoral Professional Development Seminar Series throughout the year. To present this seminar series we draw on the resident community of NESCent senior scientist (sabbatical scholars and other residents) as well as on the larger community of scientists in the Triangle, with strong participation from the three partner institutions (Duke, UNC-CH and NCSU). Recent topics have included "Giving job and chalk talks...things to do and not to do," "Mentoring across diversity," "Writing letters of support and references for others," "Defining your research program in the short and long term," "Science and the media," and "How to run a meeting."

2.1.2 Targeted Initiatives

In the past three years we have introduced four targeted initiatives to jumpstart new areas of evolutionary synthesis: Evolutionary Medicine, Synthetic Biology, Evolution and the Social Sciences, and K-12 Evolution Education for Underrepresented Minorities. The K-12 Education initiative is discussed in Section 4, Education and Outreach, because it crosses both the Science and the E&O portfolios.

We have conducted several activities in 2013 to further our four targeted initiatives.

- The working group entitled "Infusing Medical Education with Evolutionary Thinking" is an interdisciplinary, international, and intergenerational Working Group of physicians, scientists, educators, and students focused on designing curricula for medical education. The group's goals are to (i) define core competencies in evolutionary biology for physicians and other health professionals, (ii) design model curricula and learning experiences that can advance evolutionary education for health professionals, and (iii) provide open access to these resources and disseminate them.
- The working group entitled "The Perils of Being Bipedal: An Evolutionary Perspective on Human Musculoskeletal Disorders" is focused on teaching evolutionary thinking to medical students through the charismatic subject of our uniquely human stature and gait. This group will (i) develop and implement a model curriculum, (ii) create a website with course materials and supporting information, and (iii) publish an edited volume of papers on human musculoskeletal disorders.
- The catalysis meeting entitled "Ecological Models and Social Networks: How evolutionary forces shape networks and communities," will meet in October 2013 to explore the potential for identifying evolutionary processes as causal mechanisms for change in social networks.
- The working group entitled "Learning Evolution from the Fossil Record: K-12 Explorations in Deep Time" brings together paleontologists, K-12 science education specialists, and museum education staff. They are in the midst of designing and delivering innovative programming that uses fossils to engage students in explorations of evolutionary concepts. In the proposed program, undergraduate and graduate students who are themselves under-represented minorities will serve as facilitators and mentors.
- The working group "Genetics and Genealogy: Teaching Evolution and Human Diversity to Middle School Students" is developing a curriculum for a summer camp program for middle school students. During this summer camp experience, tentatively entitled "The Peopling of the World and Me!" students will investigate their own personal history using the tools of biology (genetics and DNA) and history (personal genealogy and family history).
- A Sabbatical project being carried out by Aditi Pai, a faculty member at Spelman College (an HBCU), will involve the development of teaching modules aimed at conveying evolutionary science to women of under-represented minorities.

2.1.3 Meeting enhancement

In year 9 we continued to capitalize on our intensive assessment of the processes that ensure success for Working Groups and Catalysis Meetings. Specifically, Craig McClain, our Assistant Director of Science, became a certified meeting facilitator, and since 2012 he has actively engaged with groups that self-identified as needing help gaining productive momentum, or that NESCent identified as needing assistance. The goal is to stimulate collaboration and synthesis and consequently to boost productivity in these groups. Initial indicators are positive, but we will need another year to fully assess their effects. We have also been disseminating our highly detailed Best Practices document (produced in year 7, first deployed in year 8) to all group leaders, with encouragement to seek assistance and input on planning and running meetings.



NESCent Associate Director Susan Albert co-authored a 2013 study that found that menopause sets humans apart from other primates.

2.2 2014 Plans

In 2014, our major goal is to maintain a vital resident community and a strong set of Catalysis and Working Groups Meetings through to December. It's a priority for us to avoid a sense of lost momentum; we aim for minimal "tapering off". At the moment we have 45 meetings that are or will be scheduled between now and November 2014, and we have 9 resident postdoctoral scholars and 5 resident sabbatarians. We will have no new incoming postdocs, but 6 of our current postdocs are likely to complete their full terms, and we have two sabbatarians who have just been awarded residency for 2014, one in spring and one in fall. We also plan one more round of applications for Catalysis Meetings and Sabbatical Scholars in February 2014, and we anticipate a continued set of robust applications for Short-term visitors through November 2014. From the perspective of the quality and quantity of proposals we are receiving, NESCent is, in fact, continuing to gain momentum and is poised to support increasingly high-quality work in the last year of our core funding.

3. INFORMATICS

NESCent's informatics program remains far-reaching and highly active. NESCent provides a high level of IT support for the Center's Administration and Sponsored Scientists, access to HPC resources, custom informatics support for computationally intensive sponsored science projects, training and outreach programs that build human capacity in the wider

evolutionary science community, and incubates cyberinfrastructure in support of synthetic science. A number of projects incubated at NESCent, such as Dryad and ImpactStory, have in the past year secured funding to establish themselves as independent nonprofit companies, with the potential for long-lasting impacts extending beyond evolutionary science.

In the last Annual Report, we identified a number of priorities for the informatics program:

1. Using the informatics projects at the Center to a greater extent as training opportunities for local undergraduate and graduate students from a variety of academic programs (e.g. biology, computer science, information science). Several graduate students have been part of the Informatics team in the past year, drawing on talent from a range of graduate programs, including information and library science, computer science, and biology.
2. Scaling up our effort to work with our sponsored scientists in securing institutional homes and external support, where needed, for ongoing informatics activities on projects that were begun with NESCent support. This work is ongoing. An example of a successful effort is the delivery of the Fossil Calibrations Database, which will be maintained by the journal *Palaeontologia Electronica* to support a new publication track for fossil calibration reports.
3. Increase the proportion of NESCent's informatics program oriented toward externally-funded projects in support of sustainable community

resources. The trend in this direction has continued with the ramping up in the past year of the Open Tree of Life project, scheduled for a first public release in late 2013.

3.1 2013 Activities

3.1.1 Support for Sponsored Science

NESCent continues to support the informatics needs of sponsored science through a standard suite of services (for online collaboration, high-performance computing, videoconferencing, etc.) and custom support for more specialized projects. In the past year, we have been aided by the recruitment of expertise in user experience (UI/UX) design and testing on the informatics team. The following examples of accomplishments in the past year illustrate the diversity of custom support projects undertaken:

- The development of a generic web application for collaboratively compiling the data for a large trait database. This is a common use case among NESCent sponsored scientists, and currently needed by three active Working Groups. The application handles data upload, validation, search and download.
- The completion of the Fossil Calibrations Database mentioned above, which is the capstone accomplishment of the "Synthesizing and databasing fossil calibrations" Working Group. It is scheduled for a public launch at the Society for Vertebrate Paleontology meeting in October 2013.
- NESCent staff helped organize and participated in the second "Phylotastic!"¹ hackathon of the "Hackathon, Interoperability, Phylogenies Working Group", hosted at iPlant in January.
- In support of the Sabbatical project of Michael Wade, the lab notebooks of his late mentor Thomas Park, were digitized and transcribed through use of Amazon Mechanical Turk, a service that provides a programmable interface for human intelligence tasks. These notebooks contain the data from Park's classic flour beetle competition experiments. These are to be released as a data paper and will be the basis for a data-in-the-classroom curricular module, developed in collaboration with the Dryad Digital Repository.

3.1.2 Training and community building

NESCent helped organize and had a healthy presence at the 4th Conference on Informatics for Phylogenetics, Evolution, and Biodiversity (iEvoBio), which was held in June in Snowbird, Utah, in coordination with the joint ASN/SSB/SSE Evolution Conference. The meeting, which promotes collaborative, open-source software and standards development in the fields of evolution, ecology and biodiversity science, had over 120 participants. Remarkably for an informatics meeting, this year the organizing committee and both keynote speakers were all female.

NESCent served as a Google Summer of Code mentoring organization for the 7th year in a row. The program provides a full-time summer internship in open source software development with mentoring by experts drawn from the evolutionary informatics community at large. This year, the program mentored seven student projects. An additional student project was sponsored through the GNOME Outreach Program for Women.



NESCent's Karen Cranston, who heads the Open Tree of Life project.

In her role as NESCent's Training Coordinator, Karen Cranston served as an instructor at four Software Carpentry workshops in the past year: at the University of Arizona in February; NESCent in May; Wuhan Institute of Virology in Wuhan, China in July; and the University of Kansas in August.

Jim Balhoff, a research developer with the NESCent-incubated Phenoscope project served as an instructor for the NESCent Academy course "Ontologies for Evolutionary Biology" for the second year in a row. The course seeks to promote community growth and adoption of ontology-based methods and tools, with subsequent benefits in the form of shared access to the unique data store of each community.

NESCent continues to take advantage of opportunities for collaboration with other NSF sponsored centers. For instance, NESCent is a regular participant in the SESYNC-led COLLAB-IT project, which provides a forum for knowledge exchange among IT staff from multiple NSF-sponsored centers. Another collaborative project, funded by a supplement to BEACON, aims to address the lack of knowledge sharing, software uptake, and ready-to-use materials for cyberinfrastructure training on promoting and facilitating reproducible research.

3.1.3 Externally-funded projects

The core NSF funding to NESCent enables the Center to initiate or participate in a number of externally funded cyberinfrastructure projects that are aligned with the Center's mission. Some of these grow out of sponsored science projects while others have the aim of improving the capacity for synthetic evolutionary science more generally.

NESCent continues to be the base of research and development for the Dryad Digital Repository through both core and external NSF funding. The repository is growing in importance as a trusted home for the long tail of data underlying scientific articles, and currently holds nearly 4,000 data packages from articles appearing in over 250 journals, books and theses. The repository, governed since 2012 by an independent membership-based not-for-profit organization, has realized a critical part of its sustainability plan by recruiting paying members starting in January 2013 and introducing Data Publication Charges for deposits in September 2013. Through Dryad, NESCent is an international participant in the EU FP7 ODIN project, which aims to demonstrate interoperability between data identifiers (e.g. DataCite DOIs) and researcher identifiers (e.g. ORCIDs) and thereby facilitate researchers to receive credit for shared data. Todd Vision also serves as a co-PI in the Data Observation

Network for Earth (DataONE), an NSF-funded virtual network of data repositories and registries in environmental science, ecology, and evolution; Dryad is a member of the network.

Karen Cranston of NESCent leads the Open Tree of Life project, which aims to create the first comprehensive draft tree of life by synthesizing existing phylogenetic and taxonomic knowledge, and building tools that will enable the community to improve, annotate, and expand this tree into the future. The project is supported by a three-year, \$5.76M NSF grant to a team of researchers from ten universities. In the past year, the team has, among other things, collected >2,600 studies with >6,000 phylogenetic trees, and held a well-attended Tree of Life symposium at the Evolution 2013 meeting. The Open Tree of Life is providing guidelines for NSF data management plans in systematics and phylogenetics to ensure future phylogenies are digitally available. A soft release of the comprehensive draft tree is planned for late 2013.

ImpactStory is a service that aggregates and displays the online conversation around research products including articles, datasets, and grey literature, with the aim of supporting broad, ground-up adoption of more inclusive research impact understanding and assessment. The project, which was incubated at NESCent by former DataONE postdoc Heather Piwowar and UNC-CH student Jason Priem, became a wholly self-sufficient nonprofit organization after receiving a \$500K grant from the Sloan Foundation, and a further \$300K from the NSF.

NESCent continues to promote Generic Model Organism Project (GMOD), which develops and maintains open-source genome informatics software. The goal of the collaboration is to nurture a distributed but collaborative software developer and user support community by organizing annual GMOD meetings and courses, providing training workshops at conferences, curating online documentation and tutorials, overseeing help and feature request traffic on the project mailing lists, and related activities.

NESCent is involved in software development for Phenoscope, an NSF-funded research project that aims to demonstrate the potential for synthesizing phenotypic information across diverse systematic and genetic studies using semantic technologies. The project grew out of an early NESCent working group. NESCent and iPlant are currently exploring the possibility of using some of Phenoscope's infrastructure and methodology for phenotype data within iPlant.



Jason Priem and Heather Piwowar, co-founders of ImpactStory, presented their work at the White House in June.

3.2 2014 Plans

In the coming year, while continuing our core functions, we will be focusing special attention on three areas:

1. Undertaking a comprehensive inventory of data and software generated from and about NESCent activities. We will work with past and present sponsored scientists to ensure that datasets and software that fall under the NESCent Data, Software and Publication Policy are being distributed in a manner consistent with that policy. We will ensure that plans exist for continued maintenance and hosting of online databases, and in the absence of viable options for continued maintenance we will work with scientists to archive their contents. We will distribute to PIs collaboratively created text and multimedia content, either for their private records, or to be publicly hosted by another party (institution, or service provider). We will curate the product information in NESCent's administrative database to ensure that it is as up-to-date and correct as possible.
2. Promptly concluding custom support projects to ensure that we have the capacity to satisfy our remaining commitments.
3. Showcasing NESCent and its accomplishments, including informatics, at the tri-society Evolution meetings in Raleigh in June 2014. One specific goal is to provide a sophisticated conference website and online program.

4. EDUCATION AND OUTREACH

NESCent's 2013 Education and Outreach efforts reflect the maturity and stability of activities that have been developed and implemented over the preceding eight years. The past year is characterized by the continuation of programs that are "tested and true" and have a history (in some cases, a history of several years) of success and positive impact.

While we did introduce some new and noteworthy programs or partnerships, our primary efforts focused on maintaining existing, successful programs and pursuing partnerships and funding to lead to sustainability for our most successful education/outreach programs as we prepare to enter the final year of NSF funding.

As we have done in previous years, we can summarize these activities most effectively in the context of the five pillars of NESCent Education/Outreach:

1. Outreach to the Education Community
2. Outreach to the General Public
3. Outreach to Underrepresented Minorities
4. Outreach to International Science and Education Communities
5. "Inreach" to the Science Community

4.1 2013 Activities

4.1.1 Outreach to the Education Community

For the third consecutive year, NESCent's Darwin Day Roadshow program sent teams of NESCent scientists/educators to K-12 institutions in small, rural communities around the country to celebrate Charles Darwin's birthday with talks about evolution research being conducted at NESCent, and careers in science. This year, nine scientists/educators (including eight from NESCent, four of them being postdoctoral fellows) visited nine schools in six states (CA, FL, IN, KY, NC and VT). The non-NESCent participant was Dr. Lisa White, Director of Education and Outreach at the University of California Museum of Paleontology, and her participation represents the first time we have partnered with a non-

¹ Stoltzfus A, Lapp H, Matasci N, et al (2013) Phylotastic! Making tree-of-life knowledge accessible, reusable and convenient. BMC Bioinformatics 14,158, <http://dx.doi.org/10.1186/1471-2105-14-158>

NESCent colleague to expand the scope of the program to states/schools we would otherwise not have been able to visit. We have now visited 16 different states over three years. We have submitted a pre-proposal for an American Honda Foundation STEM Education award to sustain this program beyond November of 2014.

In partnership with AIBS and BEACON, our annual Evolution Symposium was organized as part of the National Association of Biology Teachers (NABT) annual conference, which was held in Dallas, TX on 2 November 2012. Entitled "Evolutionary Transformations: The Legacies of Two Influential Scientists on Evolutionary Thought", the symposium examined the legacies of two prominent evolutionary scientists (Lynn Margulis and James Crow) who had passed away in the previous year. As always, our symposium was complimented by a hands on workshop intended to provide teachers with classroom resources and activities to introduce the topic of the symposium to their students. This year's symposium was noteworthy in that it represented the final year of partnership with AIBS (who has co-organized the symposium with NESCent every year since 2005) and the first year of partnership with BEACON. The BEACON partnership is being established so that this important and popular annual symposium will be sustained at the NABT conference even if NESCent is not able to secure sustainability funding beyond November of 2014.

The 2012 NABT conference also represented the first year of implementation of the "NESCent Evolution Scholar Award", a travel award program to send motivated and enthusiastic biology instructors (from both high schools and community colleges) to the NABT conference to acquire new evolutionary knowledge which they can then share with their students (through classroom activities) and colleagues (through professional development activities). In its first year, the program supported conference participation for Dr. Jaime Sabel (Kirkwood Community College, Cedar Rapids, Iowa) and Mr. Barry Greenwald (Harding High School, St. Paul, MN). In Year 2 of this program, BEACON will join NESCent as a co-sponsor, doubling the number of awardees and laying the foundation for sustainability in the event that NESCent support comes to an end in 2014.

NESCent continued our co-sponsorship of the NABT Evolution Education Award, along with BEACON and BSCS. This year's winner is Paul Strode (Fairview High School, Boulder, CO).

We once again delivered our annual three day summer workshop for high school instructors. This year we introduced a new and extremely successful partnership with Dr. Jason Cryan at the North Carolina Museum of Natural Sciences. Two days of the three-day workshop were held at the Museum, greatly expanding the learning resources and instructional staff on which we could draw. As with other new partnerships, this one was established, in part, as a way to work towards sustainability of our most successful and impactful programs in the event that NESCent's funding ends in 2014. In addition, as always, we offered multiple other workshops, short talks and presentations for high school teachers on effective strategies for teaching evolution throughout the year.

4.1.2 Outreach to the General Public

The highlight of our outreach efforts for the general public continued to be the annual Darwin Day event we cofounded and co-sponsor with the North Carolina Museum of Natural Sciences. This day-long event attracted several thousand visitors to the museum on 16 February 2013.



The Darwin Day Roadshow pays a visit to Urban Promises Academy in Oakland, California. Here, a student examines the skull of a saber-tooth cat.

NESCent hosted the keynote speaker (Dr. Roland Kays, NCNMS) and ran several interactive stations and booths. NESCent also sponsored or co-sponsored several other evolution-related talks for the general public, many in partnership with the NC Museum of Natural Sciences.

4.1.3 Outreach to Underrepresented Minorities

We continued to organize and run a collection of evolution outreach activities at the annual SACNAS (Society for the Advancement of Chicanos and Native Americans in Science) conference. "Evolution and Ecology at SACNAS" has been run for several years at the conference, and NESCent continues to be the primary organizer of these events, with co-sponsorship from NCEAS, NIMBioS, SSE, and AIBS. As always, NESCent postdocs were involved as symposium speakers and mentors to minority undergraduates attending the conference. This is another program with which BEACON has begun to collaborate to ensure sustainability beyond 2014.

We once again collaborated with Scott Edwards (Harvard) and Rich Kliman (Cedar Crest College) on the Undergraduate Diversity at Evolution program, which sends undergraduates to the annual Evolution (SSE/SSB/ASN) conference and provides them with mentoring and professional development while there. For the second year in a row, NESCent assumed full financial responsibility and organizational oversight for the program, which brought 20 undergraduates (most of them from underrepresented minority groups) to Snowbird, Utah. We are currently working on a proposal to be submitted to the NSF to secure sustainability funding for this program beyond 2014.

We continued the NESCent MSI Faculty Travel Award program, as well, by sending two faculty members from minority-serving institutions to the Evolution 2013 Conference in Snowbird, UT to present original research, and mentor diverse undergraduates. This year's winners were Drs. Elizabeth Torres (Cal State Los Angeles) and Yonas Tekle (Spelman College, Atlanta, GA).

NESCent's SALSA (Seeing and Learning Science Afterschool) program, continued and expanded. This program was developed by a team from NESCent to visit after-school programs – primarily serving underrepresented minority students – to teach students basic concepts in evolutionary biology through engaging, hands-on activities. SALSA

was run at programs serving primarily Hispanic, African American and Karen (Myanmar) students. Workshops were delivered in both English and Spanish. Over the past year, we have begun a collaboration with colleagues at New Mexico State University to implement the program for Spanish-speaking students in the Las Cruces, NM area. We also completed Spanish translations of all modules and activities and added these to the SALSA website.

Travel awards were given to several students from underrepresented minority groups to participate in short courses and workshops offered by the NESCent Academy (see "Inreach").

4.1.4 Outreach to International Science and Education Communities

The NESCent Ambassador program grew and expanded, with several new or continuing international programs that included:

- Belize – As a follow-up to the November, 2011 trip to the Caribbean (which included Jamaica, Trinidad, Barbados and Belize), a team consisting of Drs. Jory Weintraub (NESCent Asst. Director of Education & Outreach, and NESCent Ambassador program manager) and Adam Smith (NESCent postdoctoral fellow) returned to Belize. There, they conducted two separate two-day workshops ("Understanding and Teaching Evolution" - www.nescent.org/eog/Belize2012) for Belizean high school science instructors. Combined, the two workshops provided professional development for nearly 50 instructors, which represented over two thirds of all high school instructors in the country.
- Quito, Ecuador – A new ambassadorship this year was organized in collaboration with Dr. Juan Manuel Guayasamin of the Universidad Tecnológica Indoamerica in Quito. Three NESCent Ambassadors (Dr. Brian Wiegmann, NESCent Assoc. Director of Education and Outreach and NCSU Professor of Entomology; Dr. Jeet Sukumaran, Duke University postdoctoral fellow; and Matt Pennell, Univ. of Idaho graduate student and former NESCent Graduate Fellow) lead a 10-day workshop for South American graduate students, postdocs and faculty entitled "Theory and Practice of Phylogenetic Inference".
- Bali – For the third year in a row, NESCent ambassadors conducted a two-week workshop on phylogenetic inference for Indonesian scientists and graduate students at the Indonesian Biodiversity Research Center (IBRC). This year, the instructors were Drs. Allen Rodrigo and Stephen Wu. Based on the success of the 2011 and 2012 ambassadorships to the IBRC, Dr. Paul Barber (UCLA Professor of Ecology and Evolutionary Biology, and IBRC Director) had included funding for this ambassadorship in an NSF PIRE grant that he received, thus ensuring sustainability of the Bali Ambassadorship beyond NESCent's currently funded time period.

We requested and were awarded a no-cost, one-year extension of this program. The current Ambassador funding will come to an end on April 30th, 2014. In the remaining time, this program will offer ambassadorships to Trinidad, Kenya, Jamaica and the Galapagos.

4.1.5 "Inreach" to the Science Community

The NESCent Academy once again offered several short courses to the evolutionary science community. This year's offerings included:

1. Next-generation Sequencing Data for Phylogenetics and Phylogeography

2. GMOD (Generic Model Organism Database) Summer School
3. Ontologies for Evolutionary Biology
4. Evolutionary Quantitative Genetics

We continued to organize and conduct a weekly seminar series for in house scientists and invited speakers from the local (NC Triangle) area. We also continued the "NESCent Director's Seminar Series" to bring in more diverse speakers from outside the Triangle area to NESCent.

We received nearly 40 entries for the third annual "NESCent Evolution Video Contest" (filmfestival.nescent.org), which was held at the Evolution Societies meeting in Snowbird, UT.

4.2 2014 Plans

As we enter our final year of funding, our efforts are focused on three objectives:

1. Continue to operate the established, successful programs described above
2. Pursue new funding opportunities (such as the American Honda Foundation and NSF grants described above) to sustain NESCent's existing Education and Outreach programs
3. Solidify and expand the partnerships (such as those described, above, with BEACON, the NCMNS and the IBRC) that will sustain programs in the event that NESCent funding terminates in November of 2014

We are optimistic that NESCent will exist beyond 2014 in some capacity, and that this will ensure our many successful education and outreach programs and activities will continue to impact students, teachers and the general public, both nationally and internationally. However, even if NESCent funding cannot be secured beyond November of 2014, we are confident that the new partnerships we have forged over the last year will sustain many or most of our key programs, and these will continue to have a positive impact on the community.

5. SCIENCE COMMUNICATIONS

Despite beginning to wind down or phase out some of our core programs, reporting year 2012-2013 was another busy year for NESCent in terms of media outreach. In that time we wrote and distributed eleven news releases highlighting published results from NESCent-sponsored projects, on topics ranging from how hummingbird flight came to be, to why menopause sets humans apart from other primates, to how high-altitude humans have evolved to differ from their low-altitude ancestors.

5.1 2013 Activities

5.1.1 Mainstream media coverage

Reporters receive NESCent releases through "Eurekalert," a news service sponsored by AAAS that nearly 10,000 registered reporters look to for forthcoming science news and story ideas. NESCent news releases for the 2012-2013 reporting year received more than 40,000 page views on the *Eurekalert* website alone, not to mention the numbers of viewers that followed in newspaper and magazine articles, blogs and other mainstream media outlets. In 2012-2013, NESCent-sponsored research was featured in more than 25 articles in the mainstream media — in outlets such as *Science News*, *National Geographic*, *Science Magazine* and *Discover*. Previous years have seen bigger media pickup — NESCent-sponsored science appeared in roughly 40 media stories in



A NESCent-sponsored study used a tiny bird fossil to shed light on how swift and hummingbird flight came to be.

reporting year 2009-2010, 65 media stories in 2010-2011, and nearly 100 stories in 2011-2012. But we're nonetheless still achieving our larger goal, which is to get research results out of specialized academic journals and reach readers beyond our immediate colleagues. The media outlets that covered our science collectively reach millions of readers each month, a readership that no academic journal could achieve.

What follows is a chronological list of our news releases from the past year and the media coverage that followed for each one (these expand

on the list in Section 2). For a full list of media coverage in 2012-2013 please see Appendix H:

New study examines how ocean energy impacts life in the deep sea. September 2012. NESCent's Craig McClain and co-authors studied deep-sea species across the globe to find out how natural gradients in food and temperature in the dark, frigid waters of the deep sea affect the snails, clams, and other creatures that live there. Similar studies have been conducted for animals in the shallow oceans, but our

understanding of the impact of food and temperature on life in the deep sea — the Earth's largest and most remote ecosystem — has been more limited. The results will help scientists understand what to expect in the deep sea under future climate change, the researchers say.

Fossil study helps pinpoint extinction risks for ocean animals. October 2012. What makes some ocean animals more prone to extinction than others? NESCent postdoc Paul Harnik and colleagues analyzed roughly 500 million years of fossil data for marine invertebrates and found that ocean animals with small geographic ranges have been consistently hard hit — even when populations are large. Picked up by *LiveScience*.

Model sheds light on the chemical reactions processes that sparked the origin of life. November 2012. The question of how life began on a molecular level — even before the first genes or living cells came to be — has been a longstanding problem in science. A model by NESCent visitor Wim Hordijk hints at a possible mechanism by which life may have gotten a foothold in the chemical soup that existed on the early Earth.

Ethiopians and Tibetans thrive in thin air using similar physiology, but different genes. December 2012. Cynthia Beall and colleagues have pinpointed genetic changes that allow some Ethiopians to live more than a mile and a half above sea level without getting altitude sickness. The genes differ from those reported previously for high-altitude Tibetans, even though both groups cope with low-oxygen in similar physiological ways, the researchers say. The study adds to our understanding of how high-altitude populations worldwide have evolved to be different from their low-altitude ancestors. Picked up by *Futurity*.

The safer sex? For a little-known primate, a new understanding of why females outlive males. February 2013. After observing an endangered lemur for more than two decades in the wild in Madagascar, Patricia Wright of Stony Brook University had a hunch that females were living longer than males. What could explain the gender gap? By taking a closer look at dispersal behavior across the lifespan, Jennifer Verdolin and colleagues think they have a clue. Picked up by *Futurity*.

Uncovering Africa's oldest known penguins. March 2013. Africa isn't the kind of place you might expect to find penguins. But one species lives along Africa's southern coast today, and newly found fossils confirm that as many as four penguin species coexisted on the continent in the past, reports Dan Ksepka and colleagues. Exactly why African penguin diversity plummeted to the one species that lives there today is still a mystery, but changing sea levels may be to blame. The fossil findings represent the oldest evidence of these iconic tuxedo-clad seabirds in Africa, predating previously described fossils by 5 to 7 million years. Picked up by *Discovery News*, *NBC news*, *Huffington Post*, the *UK Daily Mail* and *Scientific American*.

Study proposes alternative way to explain life's complexity. April 2013. Evolution skeptics argue that some biological structures, like the brain or the eye, are simply too complex for natural selection to explain. Biologists have proposed various ways that so-called 'irreducibly complex' structures could emerge incrementally over time, bit by bit. But a study by Wim Hordijk proposes an alternative route.

Small but speedy: Short plants live in the evolutionary fast lane. May 2013. Biologists have known for a long time that some creatures evolve

more quickly than others. Exactly why isn't well understood, particularly for plants. But it may be that height plays a role. In a study by NESCent visitor Rob Lanfear, researchers report that shorter plants have faster-changing genomes.

Bird fossil sheds light on how swift and hummingbird flight came to be. May 2013. A tiny bird fossil discovered in Wyoming offers clues to the precursors of swift and hummingbird wings. The fossil is unusual in having exceptionally well-preserved feathers, which allowed the researchers to reconstruct the size and shape of the bird's wings in ways not possible with bones alone. Picked up by *Science Magazine*, *Science News* and *Discover*.

Personality test finds some mouse lemurs shy, others bold. June 2013. Anyone who has ever owned a pet will tell you that it has a unique personality. Yet only in the last 10 years has the study of animal personality started to gain ground with scientists. NESCent postdoc Jennifer Verdolin and colleagues have found distinct personalities in the grey mouse lemur, the tiny, saucer-eyed primate native to the African island of Madagascar. Picked up by *Futurity*, *Audubon Magazine* and *National Geographic Magazine*.

Hot flashes? Thank evolution. July 2013. NESCent's Susan Alberts and co-authors studied mortality and fertility patterns among seven species of wild apes and monkeys and their relatives, and compared them with similar data from hunter-gatherer humans. They found that menopause sets humans apart from other primates. Picked up by *Science News*.

5.1.2 Workshops, meetings and special events

In addition to gaining news coverage for NESCent-sponsored science, we also organized several communications-related events, including:

- In October 2012 our three partner institutions — Duke, UNC Chapel Hill, and NC State — jointly hosted a national science journalism conference on NC State's Centennial Campus in Raleigh. NESCent was a member of the organizing team for the conference, which brought 400 leading science journalists, authors and bloggers to North Carolina to learn about breaking science news across various fields, including evolution.
- In March 2013, NESCent hosted a catalysis meeting aimed at improving media coverage of scientific topics that often find themselves at the center of social controversies, such as evolution, stem cells, and climate change. Titled "Reporting across the culture wars: Engaging media on evolution," the meeting brought together scientists and journalists to brainstorm ways to ensure that researchers and reporters are better prepared to help each other produce accurate media coverage.
- NESCent also provides media training and other communications-related workshops for scientists. In September 2013, for example, our Communications Manager Robin Smith led a panel and round-table discussion on media outreach for undergraduates and graduate students at the NC Biosciences Collaborative Symposium.

5.1.3 Other programs

To support coverage of evolution and related fields beyond the center, we have two programs:

- NESCent sponsors a blog contest and conference travel fellowship for evolutionary bloggers. To apply for the award, writers are required



The NESCent offices in Durham, North Carolina

to submit a blog post that highlights current or emerging evolutionary research. Winners receive \$750 apiece to cover travel and lodging expenses to attend ScienceOnline, a science communication conference held each winter in North Carolina. In 2013 the winners were New York-based freelancer Amy Maxmen, author of “Bed bugs get away with incest” (Scientific American Guest Blog), and Cristy Gelling of the University of Pittsburgh, author of “Counting fish” (The Blobologist)

- NESCent’s journalist-in-residence program, now in its third year, offers a unique opportunity for reporters, producers, and editors to work on an ambitious, exciting project of their own choosing with an evolutionary focus. Fellowships are open to salaried or freelance journalists in print, electronic or broadcast media. Journalists of all nationalities are welcome to apply. Proposals are considered twice a year, with deadlines on January 15 and July 10. We hosted three journalists in 2012-2013:
- Rebecca Searles, a staff journalist at the Huffington Post, joined us for a month in April to work on a series of articles on evolutionary psychology.
- DC-area freelance writer Carrie Arnold joined us for three weeks in April to work on several popular articles on the human microbiome and how it affects behavior and mental health.
- Multimedia designer and artist Lynn Fellman joined us for three months this summer to work on an illustrated e-book about genetic ancestry and human migration.

5.1.4 Website traffic

In 2012-2013, nearly 47,000 people from more than 170 countries visited the NESCent website. A glance at our website traffic over time suggests that we’ve not only expanded our audience, but also our international reach: 47,139 people from 174 countries visited in 2011-2012, 44,217 people from 159 countries in 2010-2011, 38,269 people from 91 countries in 2009-2010, 30,076 people from 77 countries in 2008-2009, and 22,585 people from 64 countries in 2007-2008. Many of our website visitors this past year came looking for examples of evolution for use in the classroom (4,900 page views), followed by information about our calls for proposals (3,900 page views), awards (3,300 page views) and staff directory (3,000 page views).

5.2 2014 Plans

As we enter our final year of federal funding from the National Science Foundation, our usual lineup of activities is likely to wind down:

- Our final call for entries to our evolution blog contest will be announced in September 2014, with winners announced in December 2014
- The final calls for proposals to our journalist-in-residence program will be January 15, 2014, with a start date in April 2014 or later.

6. ASSESSMENT

NESCent’s mission is to “promote the synthesis of information, concepts and knowledge to address significant, emerging, or novel questions in evolutionary science and its applications. NESCent achieves this by supporting research and education across disciplinary, institutional, geographic, and demographic boundaries.” NESCent’s assessment program seeks to evaluate how successfully we are fulfilling this mission. Specifically, we apply a three-tiered evaluation system focused on people, products, and process.

1. People: Does NESCent support research and education across disciplinary, institutional, geographic, and demographic boundaries?
2. Products: Are NESCent scientists addressing questions that are significant, emerging, and/or novel in evolutionary science?
3. Process: Does NESCent accomplish (2) by promoting the synthesis of information, concepts and knowledge both within and beyond direct Center activities?

6.1 2013 Activities

6.1.1 Ongoing Activities

NESCent’s assessment reached a significant milestone this year with the release of our second major assessment report. In year 9 we built on the cohesive assessment program across our three divisions established in year 8. As we have sought funding for continued sustainability of NESCent, we have incorporated assessment metrics relevant to prospective funders.

The NESCent Administrative Database (NEAD) continues to serve as the backbone for all the Center’s evaluative activities; its strength rests on the ability of multiple users – from center Directors and administrative staff to individual participants in NESCent activities – to engage in data entry. Virtually every aspect of NESCent’s day-to-day operations (e.g. meeting registrations, proposal processing, updating the public website), use our web-based interface of NEAD. This ensures that we use an automated process to accurately collect a wide range of data needed for assessment activities. Automated reports from NEAD have been key in reducing staff time for report generation from a few weeks to a few hours.

For Tier 2 assessment in Year 9, we continued to focus on building accurate records of publications and grants resulting from NESCent activities. By establishing this record, we were able to easily produce up-to-date estimates of the number of publications and citations for the annual report and the assessment report earlier this year. We also take advantage of ImpactStory.org, itself incubated through a Sloan grant to NESCent, to measure the usage of NESCent publications and other products (such as datasets and software) by both researchers and the public. ImpactStory allows us to capture measures including the number of bookmarks by Mendeley users, mentions in Wikipedia or on leading

Number of:	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Participants	8	169	517	952	589	796	690	1100	744	878	6443
Software/Data sets			1	21	25	16	8	14	34	2	121
Publications	1	2	24	68	65	90	79	89	113	40	571
News Coverage				4	5	45	43	65	100	25	287
Catalysis Meetings			4	6	3	4	5	5	7	0	34
Active Working Groups		2	9	15	17	20	22	21	15	12	55
New Postdoctoral Fellows		5	7	4	3	8	4	6	4	4	46
Active Sabbatical Scholars		4	5	1	5	3	5	5	5	5	38
Courses				5	11	6	7	4	6	4	43
Course Participants				78	84	142	57	123	169	97	750

Table 1: NESCent by the numbers

blogs, downloads of data in Dryad, and forks of software repositories on Github, and to systematically compare these measures to those of non-NESCent products.

Our assessment team is also actively collaborating with an assessment working group (Advancing Theory and Research on Scientific Synthesis) jointly supported by NCEAS and NESCent. The most recent meeting of the working group occurred in September at NESCent. The group brings together scientists who lead and conduct synthetic research with a diverse group of experts on scientific collaboration and research evaluation. The aim is to advance our understanding of synthesis and develop new empirical approaches for investigating it longitudinally and comparatively. One objective of the group is to map synthesis outcomes in relation to broader scientific and disciplinary areas, based on the collection of abstracts from all articles from all journals published by NCEAS and NESCent from 1991-present.

Tier 3 assessment continues to be led by Jonathon Cummings (Associate Professor of Management, Fuqua School of Business, Duke University). The goal of his ‘Science of Science Project’ is to improve the ways that NESCent promotes synthetic evolutionary science. In particular, through interviews and surveys, he is gaining a better understanding of the behaviors and attitudes of scientists towards collaboration, and how such behavior is changed as a result of NESCent support. In 2013,

Samantha Thomas (Master’s Program in Biostatistics, Duke School of Medicine) continued as a research analyst on the Science of Science project. Her responsibilities included integrating the administrative data collected by NESCent with the survey data collected by Professor Cummings, and writing SAS scripts to analyze the data. Each time the working group participants meet at NESCent, survey data is collected about their activities since the last time they met. For example, survey questions are asked about collaboration between working group meetings, methods of communication and information sharing, as well as satisfaction with how things are going in the working groups. To date, survey data has been collected from 581 participants from 33 working groups for their first meeting, 406 participants from 27 working groups for their second meeting, 381 participants from 26 working groups for their third meeting, and 207 participants from 14 working groups for their fourth meeting. The remaining survey data collection efforts are expected to wrap up in late Fall 2013, when a number of working groups have their fourth and final meeting. Three research questions being asked are: What demographic factors (e.g., background diversity, career status) predict working group outcomes? Does variation in participant motivations (e.g., publication, networking) and institutional affiliation (e.g., RO1, teaching) predict working group outcomes? How do collaboration patterns vary across meetings, and what strategies predict working group outcomes (e.g., break into subgroups, work as entire team)?

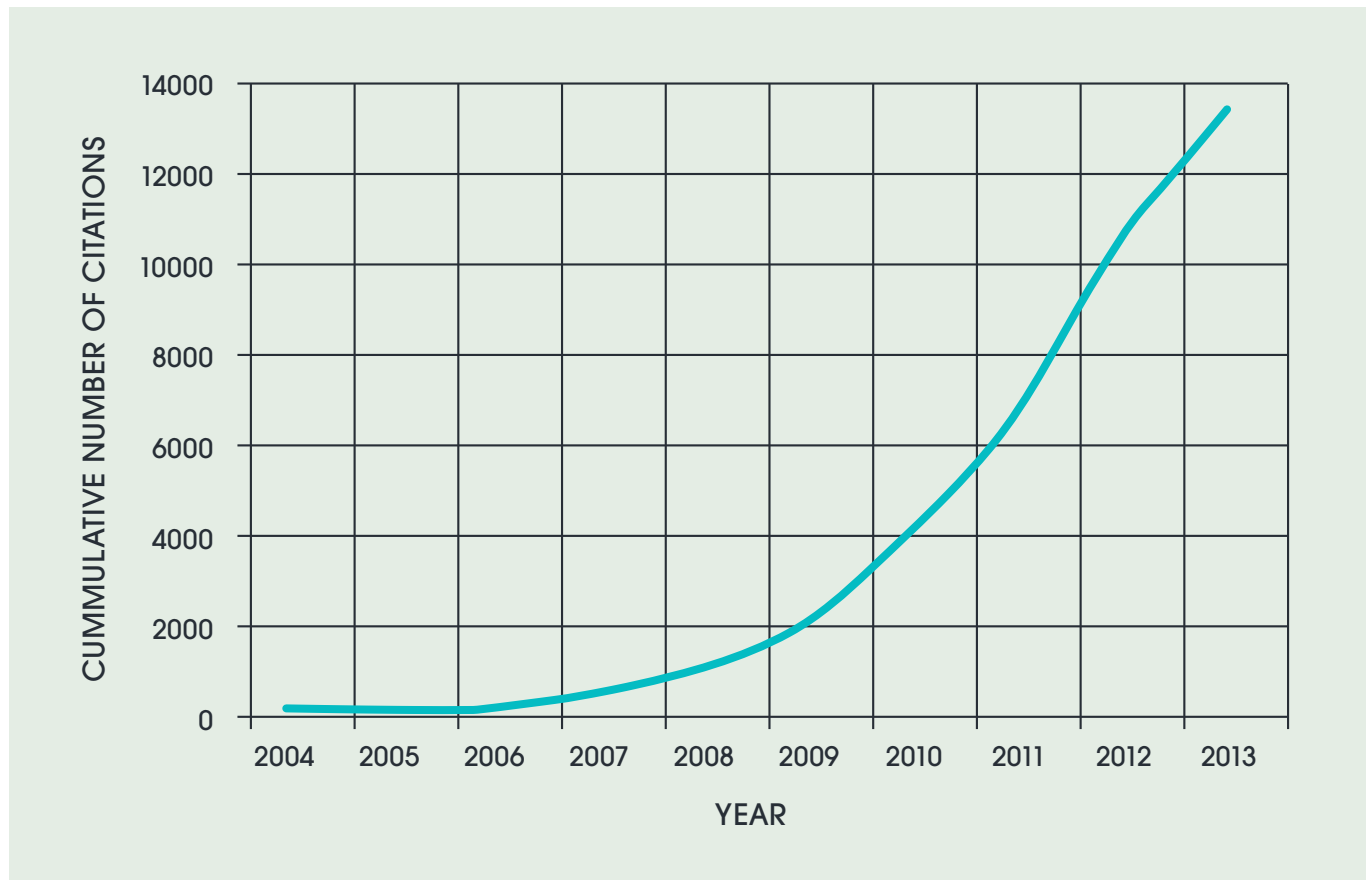


Figure 1: Cumulative number of citations per year based on all NESCent publications

Preliminary analyses have found an interesting pattern between working group size and the amount of collaboration prior to meetings (which continues to hold with the additional survey data). Specifically, the larger the working group, the less likely participants were to collaborate prior to the first meeting, the less likely participants collaborated together between the first and second meetings, and the less likely participants were to collaborate between the second and third meetings. It is also worth noting that participants in relatively larger groups reported different reasons for joining: while it was more important for them to have a safe environment for sharing new ideas, to meet and network with people in their field, and to promote broad changes within their field, participants in larger groups viewed it as less important to have the potential for manuscript publication, to advance a personal research program, or to create a new dataset, tool, or method.

6.1.2 Assessment Highlights

Table 1 summarizes the products and outputs of NESCent's activities. NESCent's h-index continues to rise. In 2010 our h-index was 27, 32 in 2011, and 43 in 2012. As of this report our current h-index is 57. Our papers have accumulated 13,219 citations compared to the 8,220 citations from last year at this time. The average citation count per paper is 23.9, up from 16.1 last year (Figure 1).

15% of NESCent publications occur in five leading multidisciplinary science journals (*Nature*, *Science*, *Trends in Ecology and Evolution*, *Proceedings of the Royal Society B*, *Proceedings of the National Academy of Sciences, US*).

Using the NESCent publications that occur in ISI Web of Knowledge, we identified subject categories for NESCent publications. A single paper may have multiple subject categories. We compared this to a randomly chosen group of NSF-funded publications in evolutionary biology from the same publication time span. NESCent publications (categories: n=34) covered twice the number of subject categories as the comparison group (categories: n=17) and were more evenly distributed among categories than the comparison group.

We compared the citation frequency for NESCent publications to the equivalent statistic for evolutionary biology publications from our peer organizations. We identified the top ranking universities (in terms of scientific output and money spent on R&D, according to NSF figures) using ISI, and searched for items published by these top ranking universities between 2006 and 2012. We added to this list the following institutions: (i) the 15 most prolific U.S. research institutions (i.e., the institutions that produced the greatest number of evolutionary biology related papers from 2006-2012 as identified by ISI), (ii) the institutions associated with the most highly cited paper each year from 2006-2012, and (iii) two additional institutions ranked by U.S. News and World Reports as the best graduate schools in ecology and evolutionary biology. Only papers in the 'evolutionary biology' category of ISI were used in the analyses. NESCent had a higher citation rate per item than all but three of the institutions on this list.

NESCent also continues to see an influx of new visitors into the center

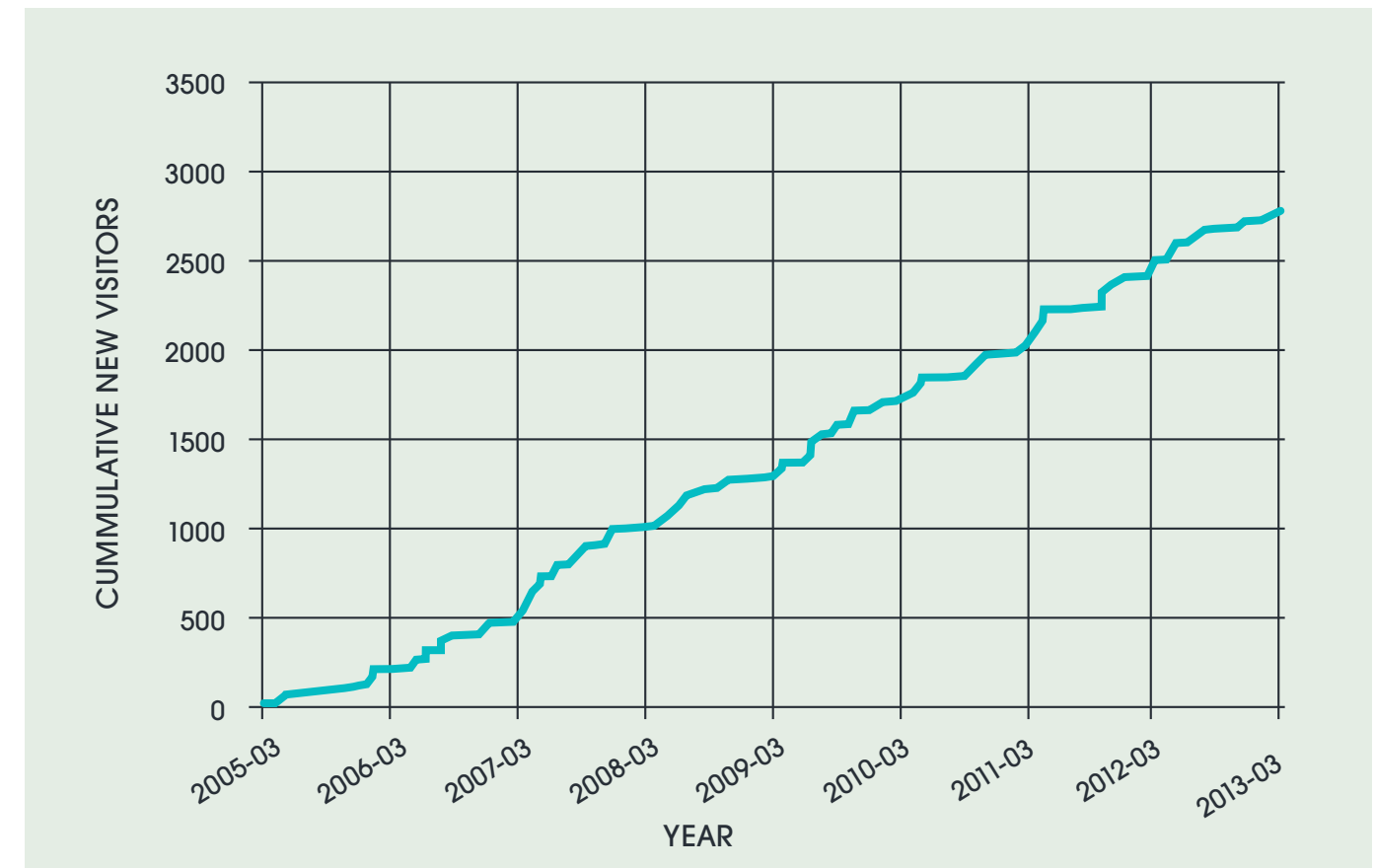


Figure 2: Cumulative new visitors per month

(Figure 2). The linear and steadily increasing trend, with no sign of an asymptote, suggests we continued to draw new communities into NESCent. We also continue to maintain a 50:50 ratio of emerging to experienced scientists in NESCent activities (Figure 3). NESCent's goal is to continuously draw upon a broad diversity of participants that span multiple backgrounds to tackle the assortment of outstanding questions in evolutionary science. Examining how participants self-describe their disciplinary backgrounds (Figure 4), NESCent appears to be incorporating a diverse set of disciplines into our portfolio. Beyond our strength in areas typically associated with evolutionary science, e.g. systematics and ecology, NESCent's portfolio also includes representation among non-biological sciences. Nearly 25% of our participants associate themselves with non-biological disciplines (Figure 4). This is reflected in NESCent publications, which traverse a broad range of disciplines incorporating much more than just evolutionary biology.

Although a majority of NESCent participants are from doctorate-granting universities either in the U.S. or abroad (total: 56.6% Figure 5), 43.4% of participants come from institution types ranging from primary education to associate/baccalaureate-granting colleges and universities, and including non-academic research settings such as NGOs, government organizations, and museums.

NESCent programs on average have 30% female representation both in terms of PIs and participants. Also, in all but two years, 2006 and 2007, NESCent has offered a greater percentage of awards to females

than represented in our applicant pool (Figure 6).

Productivity can vary substantially among working groups (0-17 publications, mean=2.58). Indeed just 20% of the groups produce 70% of the papers. Understanding the processes that underlie this variation could be utilized in internal policy decisions and to guide principal investigators and working groups toward more productive strategies. We recognize that publication output alone is not a sufficient measure of working group success, and a broader analysis based on a wider array of response variables is planned as part of the joint NESCent-NCEAS working group described above.

We collected data for 53 working groups on a variety of metrics. In the first analysis, we used only groups that had at least one publication (n=31). This allowed us to assess additional parameters associated with outside resources and parameters based on coauthorship networks. Overall, we found a model that predicted 94% of the variation in working group productivity. The model that best explained the data included the following parameters:

- the total days across all meetings that the working group met (more meetings led to less productivity but the effect was small and not significant);
- the number of working group participants who attended all meetings (better attendance led to greater productivity);
- the greater the total number of outside authors (authors who were not

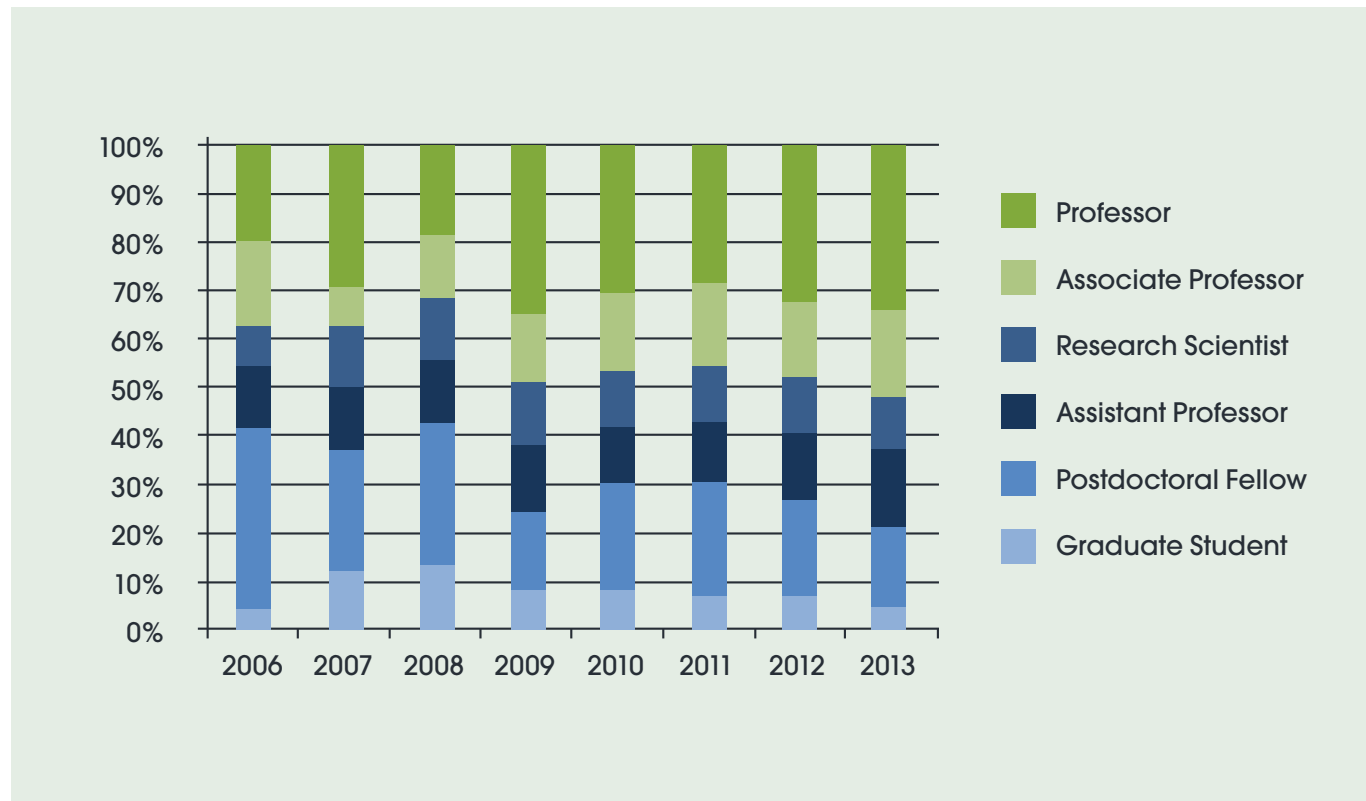


Figure 3: Percentage of professional stages participating in NESCent activities per year

participants in the working group) and total number of total authors (working group participants plus additional non-working group members) the more publications a group produced;

- those meetings that concentrated on producing infrastructure (analysis tools, databases, or methods) had fewer publications;
- groups that had greater numbers of distinct co-authorship networks (i.e. a divide and conquer strategy versus everybody works on everything) and greater division among groups (as measured by network path length) also produced greater numbers of publications;
- greater disciplinary diversity within a group was associated with a greater number of publications.

The greatest effects were attributed to the total number of authors (and outside authors) contributing to the publications and how many distinctive subgroups developed within the working group (the third and fifth items on the list above, respectively).

We also ran an additional analysis that incorporated all working groups including those without publications. This did not allow us to assess network properties or the use of people outside the working group membership. The best supported model explained 56.5% of the variance and identified five following parameters:

- groups that formed earlier in NESCent's history had more publications although this was not significant;
- groups that met more days produced more publications but again the effect was not significant;
- groups that had more time between meetings produced more publications;

- groups with better meeting attendance produced more publications;
- groups with more balanced career representation (e.g. emerging vs. tenured scientists) also produced more publications.

6.2 2014 Plans

In 2014, our assessment program will continue to focus on the sustainability of NESCent. We currently view our assessment program as having three main audiences, including our current funders (NSF), our future potential funders, and current NESCent administrators who have the goal of improving NESCent. Ongoing data collection, our collaboration with the Working Group on Advancing Theory and Research on Scientific Synthesis, and our Science of Science project, will allow us to assess a rich range of factors that contribute to successful projects and the impact of our activities on the participants, including the extent to which participation increases the likelihood of successful grant funding. We intend to publish our results and contribute to the relatively thin literature on the sociology and policy of synthetic science.

7. ADMINISTRATION

The primary focus of the past year's administrative activities at NESCent has been to increase efficiency, build better processes, review policies and prepare for the final reporting of the NSF-supported Center, and at the same time, retain the flexibility to transition to a new model.

7.1 2013 Activities

Catherine Craver replaced Phillip Grosshans as the Assistant Director for Research Administration in October, 2012. Catherine has provided leadership at Duke since 1994 in various administrative roles and also brings a wealth of experience in organizational best practice through

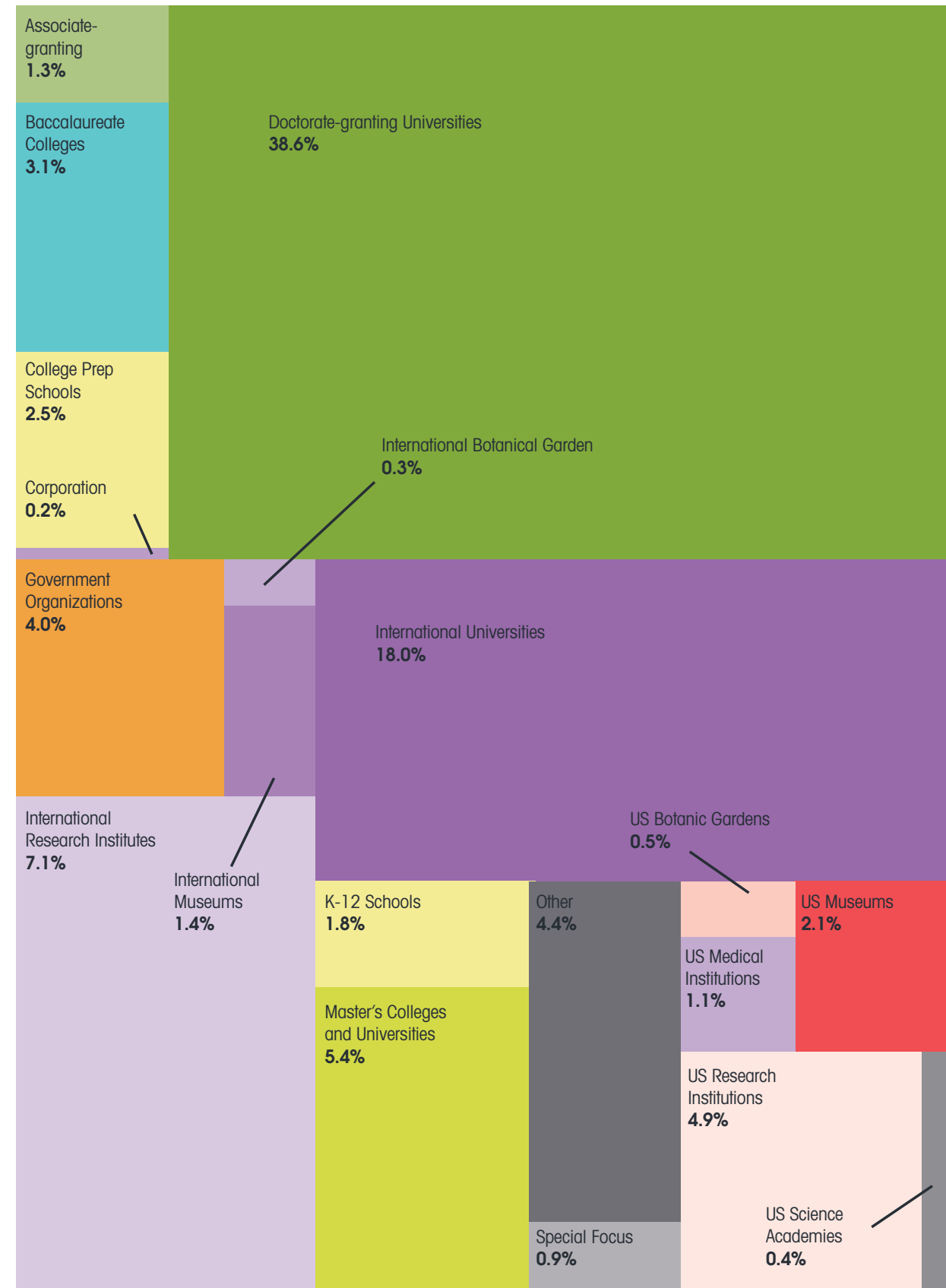


Figure 5: Home institution types for all NESCent participants since center's start

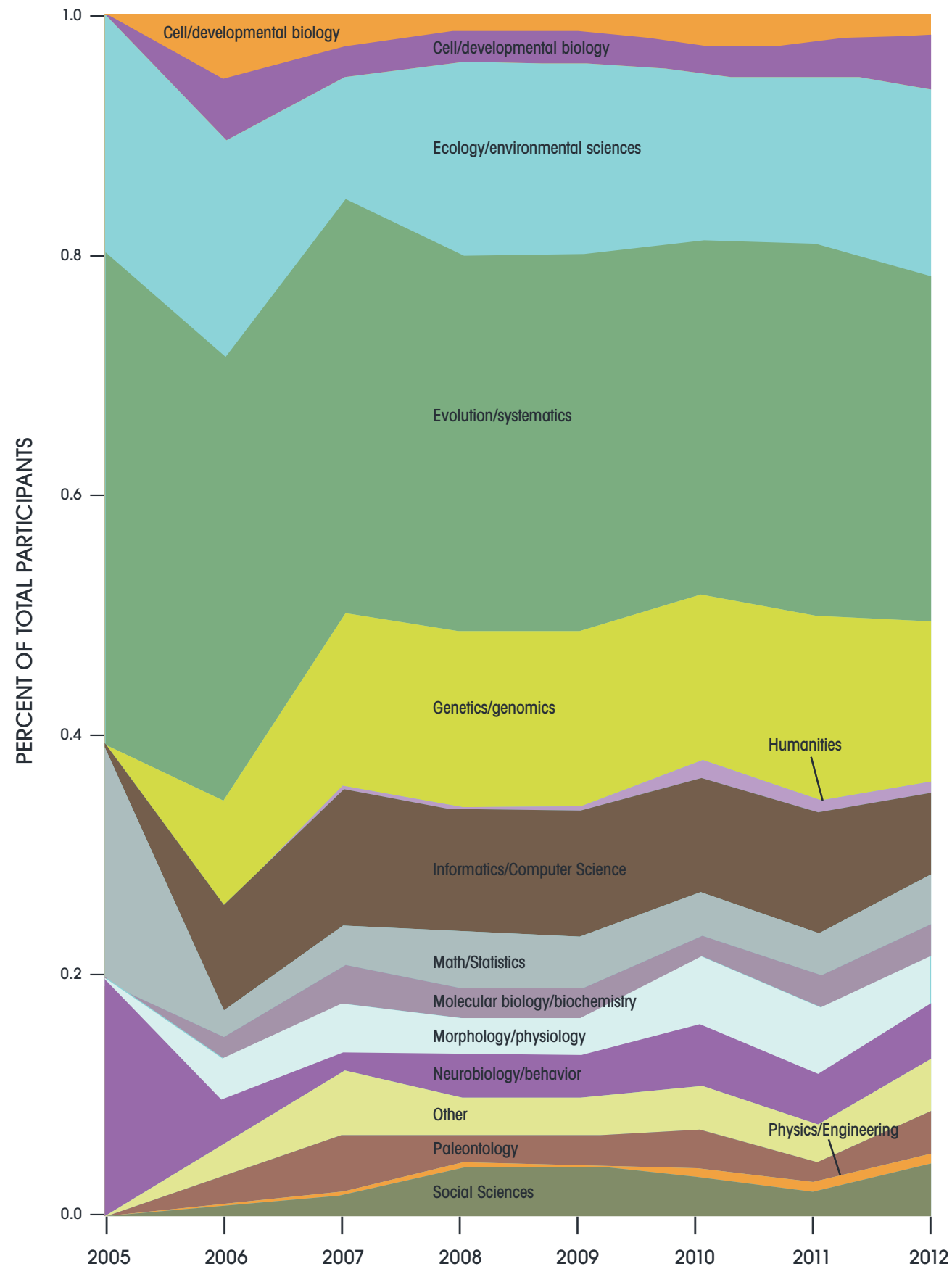


Figure 4: Self-reported representation among fields of NESCent participants

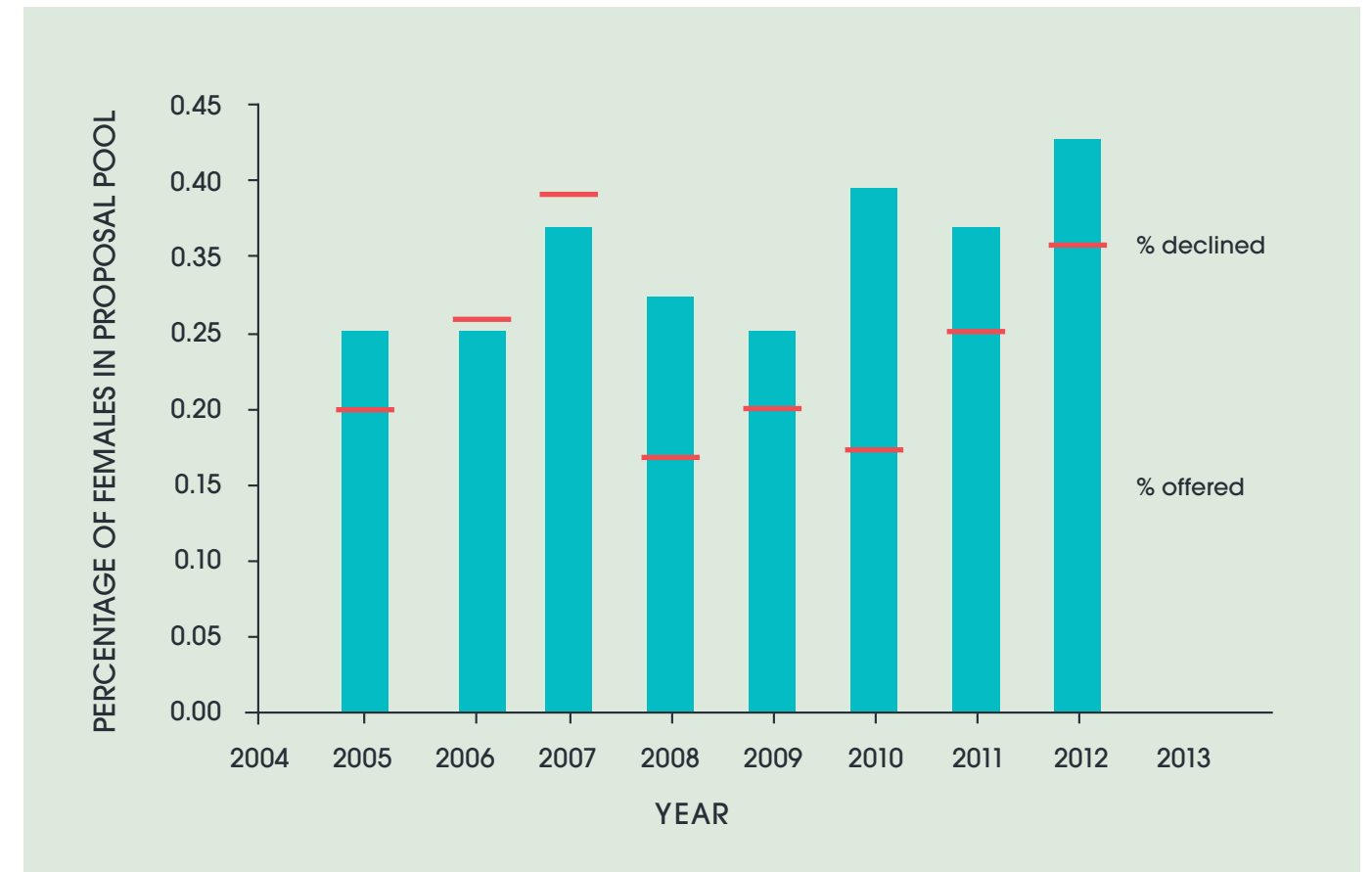


Figure 6: Percentage of females in the proposal pool for NESCent programs that were offered support (blue bars) and declined for support (red lines)

10 years as a Senior and Alumna Examiner with the Baldrige Quality Award program of the US Department of Commerce (National Institutes of Standards and Technology).

Mattison Ward who served as System Administrator departed in May, 2013 for professional advancement and David Palmer, who previously provided desktop and AV support at NESCent, was promoted to that role. We are pleased to welcome to the informatics team IT Analysts, Mercedes Gosby and Dan Leehr, and IT Strategist Jonathan Rees, who works remotely on multiple projects including Open Tree, and Dryad.

Logistics staff continues to participate in Meeting Planning International conferences and to prepare for certification as Event planners. Research Administration staff attended the NCURA meeting in New Orleans in March 2013 and will attend again in March 2014 in San Francisco. All staff are encouraged to take additional training that will increase efficiency and knowledge in support of NESCent programmatic activities.

The administrative team continued with the planning of the Evolution 2014 conference. To that end our logistics coordinators, Stephanie Risbon and Danielle Wilson, and Catherine Craver attended the Evolution 2013 conference in SnowBird Utah, working with the 2013 Organizing Committee to gain insight into how better conduct the 2014 conference. NESCent had a successful NSF programmatic site visit, and we were able to discuss our programs with the review panel. The panel were

especially helpful both in their comments to the Provosts, and their suggestions for NESCent's transition and future operations. NESCent also had a successful internal audit as part of Duke University's focus on large programs, and received a stellar report with no issues reported, and no responses required.

7.2 Plans for 2014

In 2014, NESCent has a full roster of meetings and activities, and a still-active resident community. Consequently, NESCent operations will continue unabated until at least the end of 2014. Evolution 2014 will also engage the staff at the center. In fact, we will not feel at all as though we are winding down.

Nonetheless, regardless of whether we received additional funding to remain a center, NESCent staff will have to be prepared for a transition. Where appropriate, we will provide staff with the opportunity for professional development. This may include career counselling workshops and sessions. Our goal is to make sure that all NESCent staff feel prepared for the future, whatever this might be.

8. EXTERNAL FUNDING

FUNDED: NESCent-Duke						
TITLE	PI	FUNDING AGENCY	DATES	DIRECT	INDIRECT	TOTAL
PIRE: Understanding Marine Biodiversity Along Geographical and Anthropogenic Stress Gradients	Allen Rodrigo (Forrest Rohwer)	NSF (Subaward from San Diego State University)	1/1/13–12/31/17	65,054	18,566	83,620
Collaborative Research: Automated and Community-Driven Synthesis of the Tree of Life	Karen Cranston	NSF	6/1/12–5/31/15	723,338	176,656	899,994
Totallmpact.org	Heather Piwowar	Alfred P. Sloan Foundation	5/1/12–5/1/13	108,696	16,304	125,000
Meeting: The Shape of the Future: A Workshop to Consolidate and Advance the Field of Evolutionary Developmental Biology	Allen Rodrigo & Cassandra Extavour	NSF	8/1/12–7/31/14	87,503	12,495	99,998
Supplement: Women Evolving Biological Sciences	Allen Rodrigo	NSF	11/1/12–12/31/13	48,683	1,283	49,966
EAGER: NESCent Ambassador Program	Allen Rodrigo & Jory Weintraub	NSF	5/1/11–4/30/14	239,276	25,239	64,515
Materials and Workshop for Cyberinfrastructure Education in Biology	Hilmar Lapp	NSF (subaward from Michigan State University)	5/13–4/30/14	70,946	3,907	74,853
ABI Innovation: A Novel Database and Ontology for Evolutionary Analysis of Mammalian Feeding Physiology	Hilmar Lapp (Chris Wall)	NSF (Subaward from Duke's Dept. of Evolutionary Anthropology)	7/1/11–6/30/14	27,490	15,670	43,160
ABI Development: Ontology-Enabled Reasoning Across Phenotypes from Evolution and Model Organisms	Hilmar Lapp (Todd Vision)	NSF (Subaward from UNC-Chapel Hill)	7/1/11–6/30/15	Included under UNC Chapel Hill's prime award		748,394
Using the New Digital Libraries to Make Discoveries about Biodiversity and Evolution	Craig McClain	Richard Lounsbery Foundation	8/1/13–7/31/14	43,439	6,516	49,956
Evolutionary Biology of the Built Environment	Craig McClain	Sloan Foundation	12/1/12–11/30/13	57,714	8,657	66,371
ABI Development: Dryad: Scalable and Sustainable Infrastructure for the Publication of Data	Todd Vision	NSF	3/1/12–2/29/16	2,027,103	376,533	2,403,636
DataONE: Observation Network for Earth	Todd Vision (William Michener)	NSF (Subaward from Univ of New Mexico)	8/1/09–12/31/13	183,897	52,410	236,307
TOTAL DUKE FUNDED				3,683,139	714,236	5,145,770

FUNDED: NESCent-UNC						
TITLE	PI	FUNDING AGENCY	DATES	DIRECT	INDIRECT	TOTAL
ABI Development: Dryad: Scalable and Sustainable Infrastructure for the Publication of Data	Todd Vision	NSF (Subaward from Duke Univ)	3/1/12–2/29/16	Included under UNC Chapel Hill's prime award		600,135
ABI Development: Ontology-Enabled Reasoning Across Phenotypes from Evolution and Model Organisms	Todd Vision (Paula Mabee)	NSF (Subaward from Univ of South Dakota)	7/1/11–6/30/15	1,127,219	178,572	1,305,791
TOTAL UNC FUNDED				1,127,219	178,572	1,905,926

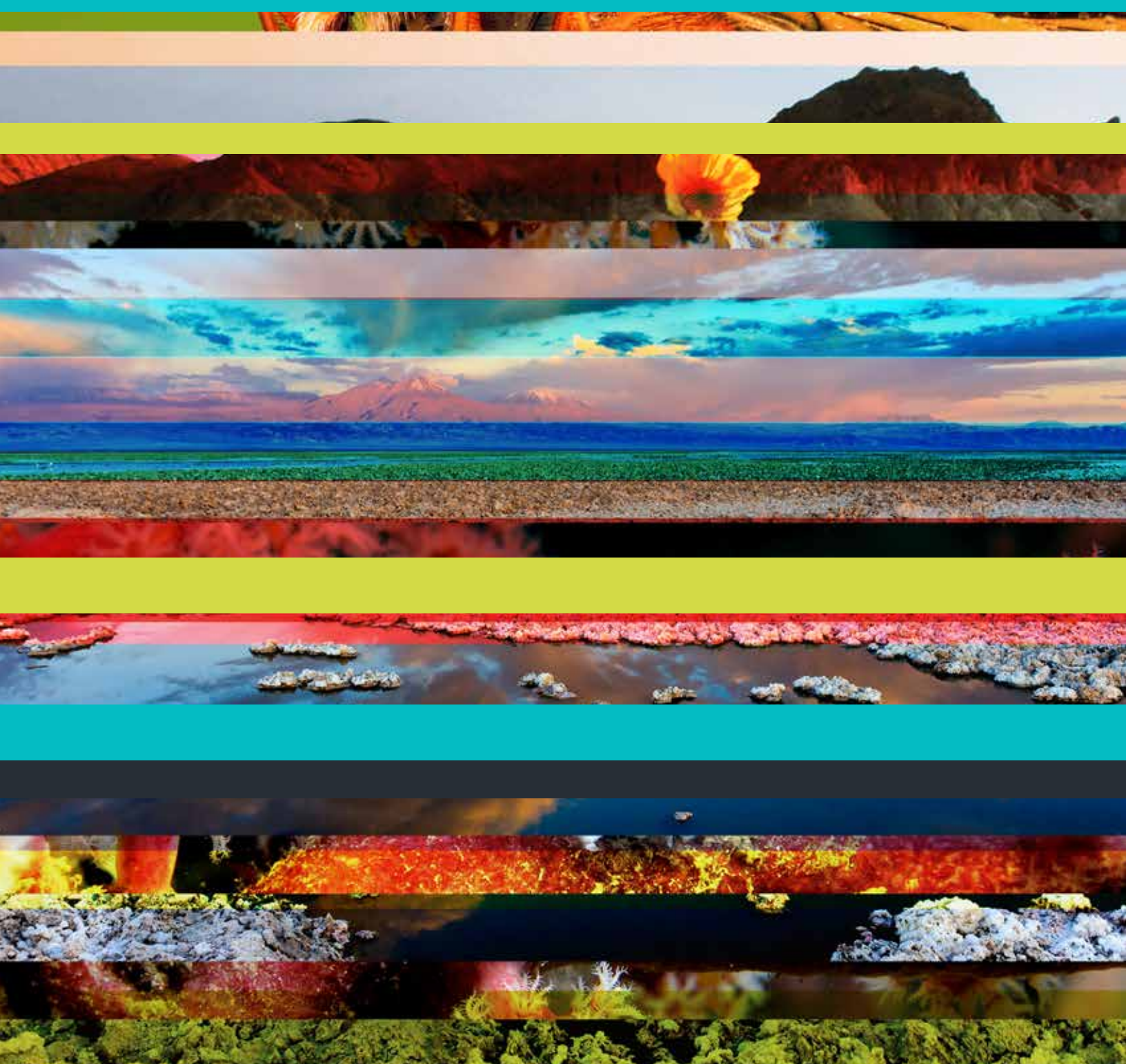
FUNDED: NESCent-NCSU						
TITLE	PI	FUNDING AGENCY	DATES	DIRECT	INDIRECT	TOTAL
ABI Development: Dryad: Scalable and Sustainable Infrastructure for the Publication of Data	Kristin Antelman (Todd Vision)	NSF (Subaward from Duke Univ)	3/1/12–2/29/16	Included under Duke University's prime award		18,827
TOTAL NCSU FUNDED				22,810	5,930	182,253

PENDING: NESCent-Duke						
TITLE	PI	FUNDING AGENCY	DATES	DIRECT	INDIRECT	TOTAL
Energetic Assembly of Biological Communities: A Test with Deep Sea Woodfills	Craig McClain	NSF	8/1/14–7/31/17	484,564	131,485	616,049
ABI Innovation: An Ontology-Based Universal Coordinate System for Navigating the Tree of Life	Hilmar Lapp (collaborative with University of Florida)	NSF	5/1/14–4/30/15	132,486	37,759	170,245
TOTAL DUKE PENDING				617,050	169,244	786,294

PENDING: NESCent-UNC						
NONE CURRENTLY PENDING						

PENDING: NESCent-NCSU						
NONE CURRENTLY PENDING						

TOTAL FUNDED						7,233,949
TOTAL PENDING						786,294
TOTAL FUNDED AND PENDING						8,020,243



The National Evolutionary Synthesis Center (NESCent) is a scientific research center that supports cutting-edge, cross-disciplinary research in evolution. The center offers a range of fellowships for visiting scientists and educators and sponsors numerous scientific meetings each year. NESCent is funded by the National Science Foundation and is jointly operated by Duke University, The University of North Carolina at Chapel Hill, and North Carolina State University. For more information about research and training opportunities at NESCent, visit www.nescent.org.

