

CCSF Topical Lunch
April 31, 2009
Genetic Diversity Studies at Cornell University

The New Life Sciences initiative has amplified the impact that Cornell makes with its genetics and genomics research. In particular, studies of genetic diversity and its conservation importance have broadened at Cornell with recent faculty hires. Also, conservation genetics is clearly within the mission of two recently formed centers, CCSF and the Cornell Center for Comparative and Population Genomics (C3PG), and is central to the mission of the Institute for Genomic Diversity. However, research on aspects of genetic diversity at Cornell is spread out across at least ten departments and three colleges, suggesting that its full impact may not be realized until potential synergies are explored and realized. Our goal was to assemble Cornell faculty working in areas related to genetic diversity, explore conceptual areas of existing research strength and their inter-relations, identify needs for expertise that are not well represented on campus, and discuss collaborative goals that can increase the visibility, impact and funding of genetic diversity studies on campus.

The discussion was organized around five focal areas of research and activity on campus:

- 1) Livestock/crop diversity, origins, and genetic improvement
- 2) Genetic diversity and health of wild species of conservation concern
- 3) The community ecological impacts of genetic diversity
- 4) Metagenomics
- 5) Management and policy decisions in the context of conservation genetics

The group recognized several axes of interrelationship across these topical areas.

- Similar investigative technology and the move to genomics;
- Computationally demanding analyses
- Benefits from and need for bioinformatics
- Ecological & evolutionary processes interacting to determine adaptive potential and persistence

Much of the discussion focused on the fifth topic where it was stressed that the technologies for genetic manipulation and management are advancing much more rapidly than the policy instruments intended to advance optimum and sustainable implementation of these tools. Examples include transgenics, reproductive manipulations in non-captive populations, and how technological advances have undermined some protections to fair and equitable development of genetic resources established under the international Convention on Biological Diversity. Genetic issues relating to population management and policy are receiving attention within the Vet school and crop sciences, but no single individual at Cornell could be identified with legal or policy expertise in this area.

Further discussion included perspectives on shared constraints and opportunities as data become more genomic and push the computational and bioinformatic boundaries of what empiricists have typically accomplished within lab groups. While there is exceptional

expertise in the Department of Biological Statistics and Computational Biology, their interests are centered on model systems in which the greatest depth and range of data are available or imminent. Diverse views were expressed about the utility of pursuing a long-term strategy of pursuing conservation-related questions through an appropriate model system and then branching out from there. The Arabidopsis model was suggested as an example because it served as a useful general precursor to most genomic studies of crops. Others voiced a desire to facilitate a decentralization and “democratization” of genomic-scale studies given that new-generation sequencing technology will make this level of data collection economically tractable. One model might be to bolster cross-training of students and postdocs so that they have the computational and programming skills to work with these data. Another possibility is to make use of Cornell’s Computational Biology Service Unit on a contract basis. Yet another avenue taken by Microbiology for new faculty working in metagenomics was to establish resources for a local computer cluster and personnel with computational expertise.

Several possible goals leading toward greater interaction and synergy were suggested including preparation of training grant proposals, curriculum development, brown-bag lunches for continued discussion, and a web page to highlight and tie together studies of genetic diversity and related training opportunities at Cornell. Curriculum development received the most attention with the recognition that courses focused on genetic diversity are few and fragmented across campus. It was suggested that development of a strong, integrative team-taught course might be the best stepping stone to proposals for training grants.

In attendance:

Matt Hare, [mph75](#), host
Alex Travis, [ajt32](#)
Adam Siepel, [acs4](#)
Senthil Natesan, ns498
John Joel Amalraj, ja444
Anurag Agrawal, [aa337](#)
Susan Cook, scc56
Kelly Zamudio, [kelly.zamudio](#)
Stephen Kresovich, [sk20](#)
Susan McCouch, [srm4](#)
Joe Bernardo, jb787
Bryan Danforth, [bnd1](#)
Margarita López-Uribe, mml82
David Dieterich, dd355
Ian Hewson, ih88
Helene Schember, hrs6
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