

The Seventh q-bio Conference: meeting report and preface

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Preface

The Seventh q-bio Conference: meeting report and preface

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This special issue consists of four original research reports, a subset of the work presented at The Seventh q-bio Conference, which took place 7–10 August 2013 on the campus of St John's College in Santa Fe, New Mexico, USA.

The q-bio Conference is central to the part of the systems biology community that focuses on quantitative, mechanistic understanding of the dynamics of cellular regulation and related processes. It is the annual flagship conference for research that integrates *modeling, theoretical, and quantitative experimental* approaches towards understanding these complex biological phenomena with the quantitative rigor of the physical sciences. It is a major systems biology forum for exchanging results and ideas, networking, and continued education in q-bio. The q-bio Conference has been held since 2007 in Santa Fe, NM. Additional events organized by the community include the q-bio summer school, held yearly in New Mexico since 2007, and, since 2012, also in San Diego, CA, and the winter q-bio meeting in Hawaii, held since 2013, which chooses a specific focus yearly within the broader q-bio field.

The q-bio Conference has been discussed many times on the pages of this journal, and interested readers can trace its growth and the expansion of its scope to include fields at the intersection of systems biology with synthetic biology, ecology and evolutionary biology, and structural biology by reading earlier editorials [1–7] and a recent perspectives article [8]. Instead, the focus of this report is the 2013 conference itself.

The 2013 q-bio Conference featured a single-track program over four days; it included 41 full-length talks (contributed and invited) and over 110 posters and poster spotlight presentations. The program was structured to give ample time for discussions, which were, as always, facilitated by the location of the conference in the relative solitude of the serene campus of St. John's College in Santa Fe, New Mexico, the home of the conference since 2007. The conference attracted over 200 attendees, which is just the right size to sustain a diverse field while fostering intimate interactions. One of the major goals of the conference organizers is promoting participation of women and underrepresented minorities in the field, and we are happy to report that almost half of all invited speakers were women this year.

Highlights of the program of The Seventh q-bio Conference (see http://q-bio.org/wiki/2013_schedule for the detailed program) included the following:

- The tutorials session on the opening day of the conference, which included six tutorial presentations that covered diverse subjects from specific software packages used by the community to mathematical foundations of biological signal processing.
- The Opening Banquet Talk, delivered by Steven Altschuler (UT Southwestern Medical Center), who focused his presentation on the importance of cellular heterogeneity—a topic that has been at the heart of q-bio since its first year.
- The Pioneer Talk by Jennifer Lippincott-Schwartz (NIH) describing exploration of the physical structure of cells with optical probes.

- The special session ImprovScience organized by Raquell Holmes, which focused on promoting communication among scientists.
- The Closing Banquet Talk, delivered by Marc Kirschner (Harvard Medical School) discussing the problem of specificity in molecular biology, illustrated by an example of targeted protein degradation.

The conference was preceded by and coordinated with The q-bio Summer School, which has attracted graduate students and postdoctoral researchers beginning q-bio careers from all over the world. In 2013, the summer school again was held on two campuses (one in Santa Fe, New Mexico and the other in San Diego, California). The school enrolled over 60 students, who each participated in one of the seven offered courses: Stochastic Gene Regulation, Cell Signaling Systems, Viral Dynamics, Biomolecular Simulations, Cancer, Synthetic Biology, and Computational Neuroscience. Lecturers were drawn from regional institutions and from around the world. Students from both campuses were brought together in Santa Fe before the q-bio conference for the Annual q-bio Student Symposium. The q-bio Summer School was supported by a Resource/Education Project grant from the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH) (R25GM105608), which allows the school organizers to attract distinguished lecturers and to offer financial aid to many students who otherwise would not be able to attend.

As is the case for any community, q-bio needs a means to disseminate new knowledge, promote the field, open communication channels among community members, and preserve snapshots of the current state of the community for posterity. This editorial and the special issue serve this goal. Over the last several years, we have established a mutually beneficial partnership with *Physical Biology*, which continues this year. We hope that this collaboration will further crystallize the q-bio community and realize new synergies. The organizers, and especially Ilya Nemenman, who serves as chief editor of the special issue, are grateful to Andrew Malloy (the Publisher of *Physical Biology*) and other journal staff for their support.

In this special issue, we are proud to present four papers that represent a small subset of works presented at the 2013 q-bio Conference. Although these papers do not reflect the full breadth of work presented at the 2013 meeting, they illustrate the singular most distinctive aspect of q-bio science, namely tight integration of quantitative experimentation and modeling. The special issue starts with ‘The dynamics of p53 in single cells: physiologically based ODE and reaction–diffusion PDE models’ by Ján Eliaš *et al.* Emphasis on dynamics is further evident in the next contribution ‘The Goodwin model revisited: Hopf bifurcation, limit-cycle, and periodic entrainment’ by Aurore Woller *et al.* Next follows the article ‘Modeling the repair of DNA strand breaks caused by γ -radiation in a minichromosome’ by K Łakomiec *et al.* The final contribution to the special issue ‘Modeling and analysis of transport in the mammary glands’ by Ana Quezada and Kambiz Vafai represents the ongoing expansion of q-bio into a more traditional discipline of tissue engineering.

What’s next for q-bio? The Eighth Annual q-bio Conference will take place in Santa Fe from 13 August through 16 August 2014, preceded as usual by the q-bio Summer School in New Mexico and in California. However, starting in 2015, the q-bio Conference will undergo some significant changes. It will start moving around, organized by rotating local organizing committees at different locations around the world. In leaving the nest, we believe the conference will best adapt to the needs of the q-bio community and will keep going strong for many years to come. In a competitive selection process, Virginia Tech in Blacksburg, Virginia, USA, has been selected as the host of The Ninth q-bio

Conference, which is scheduled for 5–8 August 2015. Up-to-date information about future events is always available at <http://q-bio.org>.

We are looking forward to seeing you at future q-bio events.

Acknowledgements

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The organizers of The Seventh q-bio Conference and the editors of this special issue are

Ilya Nemenman (Emory University).

James R Faeder (University of Pittsburgh, School of Medicine, Chair of the Program Committee).

S Gnanakaran (LANL, Chair of the Local Organizing Committee).

William S Hlavacek (LANL, member of the Local Organizing Committee).

Yi Jiang (Georgia State University).

Brian Munsky (in 2013 at LANL, member of the Local Organizing Committee).

Michael E Wall (LANL, member of the Local Organizing Committee).

(Atlanta, Georgia; Pittsburgh, Pennsylvania; Los Alamos, New Mexico; Fort Collins, Colorado–June 2014).

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