



The Society for Mathematical Biology

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Dear SMB Members,

As I am writing this end-of-year message, my university is in the process of shutting down for the holiday break. It is a peculiar thing – this is the only time of the year during which the university closes for more than a couple of days in a row. We are all forced to take a break, whether we are ready for one or not. As usual, my fall term was busy, at times even hectic and chaotic. I certainly am ready for a break, and I suspect that most of my colleagues are too.

The winter break is the perfect opportunity to sit back, reflect, relax, and rejuvenate. I hope that you still feel rested and rejuvenated from your break by the time you read this.

I want to remind you that our next SMB meeting (chaired by former SMB President Lou Gross) will take place July 25-29, 2012, at the National Institute for Mathematical and Biological Synthesis (NIMBioS), University of Tennessee, in Knoxville, TN. The deadline for submission of mini-symposium proposals is January 31, 2012. I want to encourage all of you, new and seasoned members of the SMB, to consider putting together a proposal. Details are available at nimbios.org/SMB2012. I hope to meet many of you there.

In the meantime, there are many other interesting conferences and workshops in mathematical biology organized around the world. We post links to many of them on our website at www.smb.org. If you are organizing an event that is not yet posted there, send us the link so that we can include the information.

I wish all of you a peaceful and productive 2012.

Best wishes,

Gerda de Vries





Casablanca International Workshop on Mathematical Biology: Control and Analysis Casablanca, Morocco

Sarah Olson and Vivi Andasari

*(Edited and submitted by Amina Eladdadi &
Abdessamad Tridane)*

Casablanca International Workshop on Mathematical Biology was held in Casablanca, Morocco from June 20-24, 2011, and was hosted at the University of Hassan II (Mohammed Sekkat library and Ben M'Sik Campus). The workshop was organized by Drs. Abdessamad Tridane, from Arizona State University, Amina Eladdadi from The College of Saint Rose NY, and Noura Yousfi from University of Hassan II, Faculty of Sciences Ben M'Sik, Casablanca, Morocco. This international meeting drew over 200 participants from all over the world.

The organizers put together an impressive scientific and social program. The social program was no doubt the highlight of the Casablanca International workshop, which made it a delightful, pleasant and unforgettable experience for all of the attendees. The scientific program included a mixture of plenary and workshop lectures by leading experts in Mathematical Biology, contributed talks by junior scientists, a round table, and a poster session. A total of eighty talks and thirty-five posters were presented. They covered a wide range of topics in mathematical biology including modeling of emerging diseases in Africa, cancer modeling, calcium oscillation, population dynamics, and signaling networks, control theory, among others. The plenary speakers included Helen Byrne, Carlos Castillo-Chavez, Jean Clairambault, Saber Elaydi, Abdelhaq El-Jai, Urszula Ledzewick, and

James Sneyd.

Following the opening remarks by the Chancellor of University Hassan II, and the workshop co-chairs, Prof. Carlos Castillo-Chavez of Arizona State University kicked-off the plenary lectures with his talk, "Open challenges and opportunities in mathematical epidemiology." His talk emphasized that there exists a 'shifting paradigm' as more diseases emerge and resurge. Current modeling efforts use standard SIR models as well as agent based models in order to understand and capture the spread of disease in cities, feasibility and effectiveness of responses, cross immunity, and movement of people via transportation. In order to relate these concepts to common parameters in SIR models, such as the basic reproductive number, there must be an understanding of the coupling between different scales. Another take home message of the talk was that with resurging diseases, each epidemic changes the landscape of the immunity across each country. This excellent talk initiated a great start to the conference, highlighting how mathematical models in epidemiology have had success in the past and that there are many open questions for young researchers to study in the future. The second plenary talk of the first day of the conference was given by Prof. Saber Elaydi from Trinity University. This lively talk gave an overview of the theory of nonautonomous dynamical systems. Throughout the mathematical description of the equations, he emphasized the incorporation of periodicity into these equations. In terms of biological modeling, this periodicity could be in terms of the four seasons, for example. For periodically forced dynamical systems, attenuation and resonance were discussed.

Prof. Abdelhaq El Jai, from the University of Perpignan, France opened the second day of the workshop with the plenary talk on "Modelling and Analysis of Distributed Parameter Systems (DPS):





Prof. Carlos-Castillo Chavez giving his plenary talk

Approaches Motivated by Real World Problems.” He gave an immaculate overview and talked about the history of the systems theory. He then went on to explain the complexity of the DPS modeling due to input space variables and its analysis. Prof. El-Jai also talked about some the DPS applications such as vegetation dynamics, ecosystems, water cycle, and meteorology.

After the scrumptious morning break that included the most delectable Moroccan sweets and the famous Moroccan mint tea and spiced coffee, Prof. Urszula Ledzewicz from Southern Illinois University gave the second plenary talk on the “Analysis of Multi-input Optimal Control Problems for Combination Therapies of Cancer.” In her talk, she presented the application of optimal control methods to design optimal protocols for models of various types of multi-treatments for cancer: Tumor Anti-Angiogenesis, Combinations of Anti-Angiogenic Treatment with Chemotherapy Tumor- Immune Interactions under chemotherapy and combination of chemotherapy with Immunotherapy.

An energetic James Sneyd, from the University of Auckland in New Zealand, ended the plenary lecture for the second day. It was remarked that his trip from NZ to Casablanca took over 36 hours! The focus of the talk was on calcium signaling in two distinct cell types, salivary glands and airway smooth muscle cells. In the salivary gland, it was described that calcium controls how chlorine and potassium are moving in and out of the cell, which then controls the volume of the cell and the amount of saliva that is excreted. Through the development of a calcium model in the salivary gland, the presence of certain channels was predicted and then was later confirmed in experiments. The second half of the talk focused on asthma and multiscale modeling efforts that have been undertaken to understand this disease.

The contraction of smooth muscle cells in the airways is calcium dependent. Prof. James Sneyd and his international collaborators have developed models of the individual airway smooth cell, as well as multiscale models of the lung in order to understand certain features of asthma.

Prof. Helen Byrne, from the University of Oxford, began the morning session on Wednesday (third day). Her talk focused on two different types of cancer modeling efforts by her research group and what they have learned from each other. The first was multiphase models, where different phases such as cells and fluid can be represented as cell volume fractions. These models can accurately account for tumor growth and account for the biomechanics of tumor growth. In the second half of the talk, Prof. Byrne discussed multiscale models that accounted for the dynamics of each of the individual cells within the tumor. In these models, many of the parameters can be related directly to experimentally measured values. Her talk brought great insight into the current modeling approaches that can be used to model tumor development and treatment strategies.

Prof. Jean Clairambault, from INRIA & INSERM in Paris, gave the last plenary lecture of the conference. The main focus of this talk was on the cell cycle and what goes wrong in cancer. He summarized a number of models that were either coupled systems of PDEs or ODEs to describe different aspects of the cell cycle and the molecular basis of the circadian periodic control. Due to this periodic control, Prof. Clairambault described a mathematical analysis for optimal dosing strategies to treat specific types of cancer.

The first three days of the Casablanca meeting also included three concurrent sessions of contributed and invited talks by junior scientist, a round table and



Participants touring Hassan II Mosque

a poster session. These presentations covered fields from cancer modeling, disease modeling, and other Mathematical Biology topics in general. The fourth and fifth days' events in the Ben M'Sik campus were allocated for workshop lectures, and were given by Profs. Jean Clairambault, Saber Elaydi, Helen Byrne, Eli Fenichel, and Van Savage.

Prof. Jean Clairambault opened the workshop lecture series by his presentation on "Designing Theoretical Therapeutic Optimization Procedures with Toxicity Constraints in Oncology using ODE and PDE Cell Population Dynamic Models". In his lecture, he highlighted the results on the optimization of a chemotherapy delivered in the general circulation, with targets on two separate cell populations, healthy and tumor.

Prof. Saber Elaydi brought the warm feeling of the "classroom" into his lecture on "Competition Models: Stability, bifurcation, and invariant manifolds", where everyone felt like a student again! "The old fashioned way of black board and chalk" definitely made mathematicians feel very welcome!

Prof. Helen Byrne presented an elegant lecture on simple continuum models that have been developed to describe the progress of avascular tumor growth, under the simplifying assumption of radial symmetry.

Prof. Eli Fenichel from Arizona State University kicked off day two of the workshop with an interesting spin on how mathematicians can use ideas from economics to study and model biological systems. One of the key ideas from economics is the idea of tradeoffs. An example that was used was fisheries management. Using dynamic programming, one can determine an optimal solution given the conditions of the world using calculus of variations and optimal control.

The last speaker of the workshop was Prof. Van Savage from the University of California Los Angeles. The focus of this talk was on neutral theory, metabolic theory, food webs, and competitive exclusion. A closer look was taken at several models, with a focus on body size and body-size ratios. Through deriving ways to describe these phenomena, trends of large datasets were reproduced. Within the predator prey framework, Van also emphasized the importance of accounting for foraging and the dimensionality in the system.

These "classroom" like lectures were excellent and engaged a great deal of discussion among

the audience, creating dynamic interactions with reputable researchers in the field of Mathematical Biology. We learned great deal from all of the experts! Thank you!

One aspect that the participants of the Casablanca conference will not forget is the social program, which included a tour to the famous Hassan II Mosque, Old Medina & Ain Diab beach, excursion to Rabat (Moroccan Capital) and the amazing and mesmerizing dinner gala at an historic royal palace. As conference participants entered the building, we were greeted with Moroccan musicians and singers, playing local favorites. Within the building, participants were amazed by all of the tile work and the beautiful courtyards. Before the dinner, many participants danced in the courtyard. The dinner was an amazing feast in such a beautiful location where seafood pastilla and delicious lamb with cumin were served.

With all the interesting topics of the talks and the social events, the participants thoroughly enjoyed every aspect of the Casablanca workshop. The organizers got very positive feedback from the participants who expressed interest in similar meetings in the near future.

On behalf of all participants, we would like to thank all of the speakers for their outstanding talks. We would also like to thank the organizers, for their guidance, assistance, and unmatched hospitality.

Finally, we would like to acknowledge the financial support of the Society for Mathematical Biology that helped made the trip to Casablanca possible!

A detailed description of the Casablanca workshop including the plenary and workshop lectures can be found here: <https://sites.google.com/a/asu.edu/cicwmb/home>



Participants dancing to the vivacious and irresistible Moroccan beats



Symposium on BEER-2011

Olcay Akman

The Symposium on Biomathematics and Ecology: Education and Research (BEER-2011) took place at the University of Portland campus in Portland, Oregon on December 17-18, 2011. This fourth meeting of its series attracted participants representing a wide spectrum of interest areas in biology, ecology, mathematics, statistics, and education.

The keynote presentation was given by Dr. Lou Gross of the University of Tennessee, Knoxville. The plenary speakers were Drs.' Holly Gaff of Old Dominion University and Jennifer Dunne of the Santa Fe Institute.

The meeting was sponsored by the Illinois State University (ISU) Department of Mathematics, the School of Biological Sciences, and the College of Arts and Sciences, as well as the Department of Mathematics and the College of Science of the University of Portland. The participation of several junior researchers was made possible by travel grants from the Society for Mathematical Biology. The organizers are also grateful for the contributions of Pearson Education, Cengage Learning, Hawkes Learning Systems, and SimBio.

At the meeting, several participants also enjoyed a friendly soccer match, a signature feature of the BEER symposia. Thanks to the efforts of the local organizer, Dr. Hannah Callender, the participants also had a chance to tour local microbreweries.

Differential Equations Studies in Biomathematics Applications: ICIAM 2011

Renee Fister

This session at ICIAM 2011 in Vancouver, Canada highlighted applications in ecology, biology, and medicine that involve interdisciplinary work among mathematicians, biologists, medical professionals, chemists, and computer scientists. Renee Fister from Murray State University organized the minisymposium with SMB members as speakers. Kristin Swanson from the University of Washington discussed her group's new insights about relationships between specific parameter values and imaging results that can aid in locating brain tumors earlier. Michael Mackey from McGill University discussed the connection with populations of cells in the presence of noise arising from either bursting transcription or translation. He has recently worked with colleagues in connecting these results with similar concepts found in blood disorders and cancer. Maeve McCarthy from Murray State University provided a mathematical model that describes cannibalism dynamics in adult tiger salamanders studied in the Mexican Cut Preserve in Colorado. Gerda de Vries focused on the importance of communication in animal groups and provided graphical scenarios of the patterns that develop in these directed-dependent processes.

Two interesting aspects of this minisymposium occurred. One is that Maeve McCarthy's talk title, Inter-morph Cannibalism amongst Tiger Salamanders, was voted as the most interesting talk title of the conference. Additionally, this session was chosen by SIAM to be highlighted with video recordings and brief speaker interviews. The final video clips will be promoted on the SIAM website, on SIAM's social media pages, and on their YouTube channel. Stay tuned for those to appear in the next few weeks!



Pictured(left to right): Maeve McCarthy, Gerda de Vries, Michael Mackey, and Kristin Swanson

My Career in Mathematical Biology

A Personal Journey

Louis J. Gross



How does an urban-born-and-reared kid from Philly wind up being an ecologist who's had the pleasure to use mathematics to delve a bit into the mysteries of panthers, bears, gators, raccoons, ramps, savannas and strawberries? Gather round, and

I'll spin a tale of joyful collaborations, of posing difficult questions, and invigorating mentoring, liberally sprinkled with music and dance (the latter to ensure some semblance of sanity). As all such tales do, it begins at home, as I am extremely lucky to have parents who have continually encouraged me to think for myself: "The good Lord gave you a brain, Louis, now use it!" being a regularly heard mantra from my electrical engineer father. My mother is still my mentor in culinary adventures, and I have somewhat mastered the art of pie making.

My personal journey has benefited from those amateur naturalists and scout leaders, bus drivers and metal workers by occupation, who instilled in a young teenager the wonder and great diversity of natural history even in the urban confines of Philadelphia. Much of what I know about observational science arose from the mentoring of astronomers, notably Bruce Balick and John Wardle, while I was a Drexel University undergraduate cooperative education student at the National Radio Astronomy Observatory. My first attempt to contribute to new science was applying maximum entropy methods to radio interferometry data, and it is pleasing to see that thirty years later, similar conceptual approaches are being applied to species spatial distributions.

Mathematics mostly came easily to me at Central High, where I had my first chance to try my hand at teaching as a Student Tutor and giving many planetarium talks. My first taste of the great potential for mathematics to contribute to biology

came from Charles Mode while I was an undergrad at Drexel, going through much of his book on stochastic processes applied to human demography that was published in the Springer "green book" math biology series. Simon Levin, whose enormous energy and boundless enthusiasm for the utility of quantitative approaches to both theory and application in biology, guided me through the rigors of a true applied math Ph.D. (e.g. for me, good applied math is also good science). It was Simon and my great colleague Tom Hallam at Tennessee from whom I learned the fine and gentle art of mentoring students and postdocs. My collaboration with Simon and Tom in developing and leading the long series of courses and workshops on mathematical biology for developing country scientists at the Abdus Salam International Centre for Theoretical Physics in Trieste has been one of the joys of my career as well as perhaps the most important teaching I have done.

Careful attention from Brian Chabot at Cornell introduced a very naïve mathematician to biological experimentation and my first lab and field experience in Brian's ecology of strawberries research. With a heavy exposure to differential equations and stochastic processes, I came into the core graduate ecology course sequence at Cornell unprepared biologically, but trying to place the topics in the context of dynamical systems. The marvelous regular seminars that Simon led provided a perfect jump-off point beyond the inherent focus on dynamics in the population ecology (and to a lesser extent, community ecology) of the time. I was struck by the lack of this perspective in much of physiological ecology, and given my antipathy towards blood and guts, plant biology beckoned.

Since it is perhaps the most basic life process, I had assumed that photosynthesis would be well understood. When it was clear that little information was available on the dynamics of photosynthetic response at leaf level, this became my entrée to lab (and abortive field) experiments to parameterize models. The underlying question was "does dynamics matter" to whole plant carbon gain, and my pulse and step-response to light change experiments required a model to tease apart instrument response from biological signal and then parameterize a differential equation for net carbon gain. From this I gained,

in addition to a dissertation, a great deal of respect for the intricacies of lab work. When I moved to join Tom Hallam's efforts in the Math Department at Tennessee to develop a program in math biology, it rapidly became clear that building a lab was not feasible. Thus began a wonderful collaboration with Bob Percy of UC Davis to incorporate realistic plant physiology into dynamic carbon gain models. Bob's great ecophysiology insight and laboratory expertise guided development of models that really did allow us to elucidate situations in which photosynthetic dynamics mattered.

My long-time colleague Don DeAngelis introduced me to the potential for individual-based approaches to contribute new insight to population dynamics and it has been a pleasure to watch the continuing expansion of this approach applied in many areas of biology and social science. Don and I instigated the ATLSS (Across Trophic Level System Simulation) project which consumed much of a decade of my career in developing a rational scientific basis to elucidate potential responses of the biota to alternative Everglades restoration scenarios. The challenges in linking diverse models with differing scales and underlying mathematical and computational forms, which we called multimodeling, were evident from the start. Happily, we gathered an amazing group of students, postdocs and collaborators who together managed to provide what wound up being essentially the only input on biotic impacts to the planning for this enormously expensive enterprise. Along the way, I learned a bit about the Florida panther (and associated issues of malfeasance in science), gators, savannas, and wading birds.

Everglades planning could be viewed as an extremely complex spatial optimization problem, and out of this came another major theme of my research efforts, spatial control for ecosystem management. Along with Suzanne Lenhart and Michael Berry and an outstanding set of students and postdocs with diverse backgrounds, we developed new mathematical and computational schemes for natural resource management, asking what to do, where to do it, when to do it, and how to assess success. We built new algorithms to parallelize models to make this computationally feasible (with Dali Wang). This led to applications to tick-borne disease (with Holly Gaff), preserve design for black bears accounting for human-bear interactions (with René Salinas), endangered population augmentation (with Erin Bodine) and

wildfire control. Brian Beckage and I started our long-standing set of collaborations in plant biology by evaluating harvest data on ramps (wild leeks), the analysis of which led the Great Smoky Mountains National Park to change their policy on harvesting ramps.

It was John Jungck whose leadership of the BioQuest project encouraged me in the early 1990's to focus attention on the need for a new view of undergraduate quantitative life science education. This led to my leadership and participation in many educational workshops and reports and visits to numerous institutions to encourage an integrative view of quantitative learning that is not focused solely on a calculus course, but infuses math throughout the biology curriculum. I wholeheartedly embrace the transformation of math for life sciences away from anecdotes and towards a scientific approach to evaluating impacts of our teaching.

If anything, I have acted as an instigator and team cheerleader to encourage efforts of those trained in math and computer science to collaborate with biologists and encourage the development of a cadre of individuals who have mathematical and biological intuition. This led naturally to NIMBioS and many projects which demonstrate how an integrative view of natural systems is useful in a variety of biological contexts. I expect that a goodly portion of the advances in biology over the next decades will arise from an integrative view of systems from the sub-cellular level to that of organisms to that of regional-scale issues. Such integration requires careful modeling and applications of mathematics and computational science.

My scientific and educational endeavors have been tremendous fun. However what sanity I have maintained throughout a rather hectic schedule has been due to the great pleasure I have received from my arts and music friends, notably my wife Marilyn Kallet whose poetry sings to so many and my daughter Heather Gross whose music has lit up so many of my days. My life has been enormously enriched by their talents and by those of the many musicians, writers and dancers who have befriended me over the years.

Selected publications are available at www.tiem.utk.edu/~gross/ and please view NIMBioS.org for many opportunities at the interface of math and biology.



Recent Events:

Undergraduate Research at the Interface of Mathematics and Biology, Oct. 21-22. More than 100 undergraduates from around the country presented their research at the third annual Undergraduate Research Conference at the Interface of Mathematics and Biology. The keynote speaker was Dr. J. Carl Panetta, of the Department of Pharmaceutical Sciences at St. Jude Children's Research Hospital. For more information, visit www.nimbios.org/education/undergrad_conf2011

Investigative Workshop: Modeling Free-roaming Cats and Rabies, Nov. 9-11. Between 32 and 53 million cats are estimated to roam freely in the U.S. The population dynamics of free-roaming cats and the ways in which they transmit infectious disease are not fully understood. Among the primary issues identified in the workshop were that a good free-roaming cat population dynamics model is needed. More information and a meeting summary is available at www.nimbios.org/workshops/WS_cats_rabies

Investigative Workshop: Modeling Intracellular Movements, Oct. 24-25. Advances in live cell microscopy have resulted in time-lapse observations revealing a high degree of motility inside cells. This workshop brought together experts from cell biology, mathematics, statistics, computational science and physics to discuss intracellular transportation processes, statistical tracking and biomathematical modeling. More information and a meeting summary is available at www.nimbios.org/workshops/WS_intracellular_mv

Upcoming Events:

Requests for Support. March 1 is the next deadline for submitting proposals for new scientific and educational activities at NIMBioS. Potential organizers of activities in areas of molecular biology, cell biology, network biology, immunology and systems biology are particularly encouraged to submit requests for support of Working Groups or

Investigative Workshops. Application information is also available on our website for Postdoctoral Fellows, Sabbaticals and Short-term Visitors for activities beginning summer/fall 2012. Visit www.nimbios.org

Research Experiences for Undergraduates (REU), June 11 – Aug. 3. Application deadline: February 17. For more information and how to apply, visit www.nimbios.org/education/reu

Summer Graduate Workshop, June 18-29. Applications are open for the Joint 2012 MBI-NIMBioS-CAMBAM Summer Graduate Workshop on Stochastics Applied to Biological Systems at the Mathematical Biosciences Institute at Ohio State University. Applications of stochastic processes will come from epidemiology, ecology, phylogenetics, microbiology, evolutionary biology, and genetics. Application deadline: January 13, 2012. For more information about the workshop and how to apply, visit www.mbi.osu.edu/eduprograms/graduate2012.html

Society for Mathematical Biology Annual Meeting, July 25-28. NIMBioS and the University of Tennessee will co-host the 2012 Annual Meeting and Conference of the Society of Mathematical Biology (SMB). A Call for Minisymposium Proposals is currently underway with a deadline of January 31. Conference registration will open in January. Visit the conference website at nimbios.org/SMB2012/ and follow conference details on Twitter @MathBio2012.

Communication in Collaboration Workshop, July 29-30. Collaboration across disciplines can spur major advances in scientific research. Yet, those involved in interdisciplinary research often confront obstacles to healthy collaboration. NIMBioS will soon be accepting applications for the Communication in Collaboration Workshop, to be held July 29-30, 2012. Application deadline: March 1, 2012. For more information about the workshop and how to apply, visit www.nimbios.org/workshops/WS_communication

Investigative Workshop: Modeling Dengue Fever, July 23-24. More than one-third of the world's population lives in areas at risk for the transmission of dengue, a vector-transmitted disease that is one of the leading causes of death and illness in the tropics and subtropics. Application deadline: March 1, 2012. For more information about the workshop and how to apply, visit www.nimbios.org/workshops/WS_dengue



Upcoming Workshops

Workshop: Robustness in Biological Systems
February 6-10, 2012, www.mbi.osu.edu/2011/ws3description.html

Current Topic Workshop: Recent Advances
in Statistical Inference for Mathematical Biology
February 20-24, 2012, www.mbi.osu.edu/2011/rasdescription.html

Workshop: Evolution and Spread of Disease
March 19-23, 2012, www.mbi.osu.edu/2011/ws4description.html

Workshop: Spatial Models of Micro and
Macro Systems, April 16-20, 2012, www.mbi.osu.edu/2011/ws5description.html

Current Topic Workshop: Tissue Engineering
and Regenerative Medicine, April 30 - May 4, 2012,
www.mbi.osu.edu/2011/terdescription.html

Workshop: Algebraic Methods in Systems
and Evolutionary, May 7-11, 2012, www.mbi.osu.edu/2011/ws6description.html

Current Topic Workshop: Statistics, Geometry,
and Combinatorics on Stratified Spaces Arising from
Biological Problems, May 21-25, 2012, www.mbi.osu.edu/2011/pgcdescription.html

2012 MBI Undergraduate Summer Research
Program, May 29 –August 17, 2012, www.mbi.osu.edu/eduprograms/undergrad2012.html

Joint 2012 MBI-NIMBioS-CAMBAM
Summer Graduate Workshop Stochastics Applied to
Biological Systems, June 18-29, 2012, www.mbi.osu.edu/eduprograms/graduate2012.html

MBI BioSciences Problem-Solving Workshop
(PSW@MBI), July 16-20, 2012, www.mbi.osu.edu/2012/stgrdescription.html

Call for Applications to Organize Current Topic Workshop

MBI fosters innovation in the application of mathematical, statistical, and computational methods in the resolution of significant problems in the biosciences and the development of new areas in the mathematical sciences motivated by important questions in the biosciences. MBI encourages members of the mathematical sciences and the

biosciences communities to organize MBI programs. Proposals are sought for Current Topic Workshops: stand alone meetings of up to one week.

How to Submit an Application

Applications to organize a Current Topic Workshop may be submitted to the Director (mg@mbi.osu.edu) or online at <http://www.mbi.osu.edu/forms/applyctw.html>.

Current Topic workshops are easy to organize and are usually scheduled within one year from time of acceptance. The parameters of a typical workshop are described at <http://www.mbi.osu.edu/suggestions.html>, though MBI is happy to consider different formats.

The MBI staff is responsible for all meeting logistics; the workshop organizing committee only determines speakers, participants, and workshop schedule.

The deadline for the next competition is Monday, December 12, 2011. Decisions on which Current Topic Workshops to support will be made by the MBI Scientific Advisory Committee and the Committee of MBI Directors.

Positions Available

PhD position in Computational Physiology

This project aims at establishing whether prolonged exposure to air pollutants, such as cigarette smoke, can induce changes in the cardiac function reflected in heart rate variability. To this end, time series data of beat to beat intervals obtained from roughly 1800 individuals will be analyzed using techniques borrowed from nonlinear dynamics, such as the largest Lyapunov exponent, and from statistics and information theory, including sample entropy, and long range correlations revealed by detrended fluctuation analysis. The candidate will be affiliated to the Clinical Morphology and Biomedical Engineering section of the Medical Faculty at University of Basel. The research work will be carried out at the Children's Hospital, Pediatric Pneumology, lead by Prof. Urs Frey, and within the Computational Physiology and Biostatistics Group, lead by Dr. Edgar Delgado-Eckert, who will be the direct supervisor. Deadline: 31st of January 2012. Applications should include a curriculum vitae and three letters of reference. Please send application documents by email (please include the words Computational Physiology in the subject of your email) to edgar.delgado-eckert@ukbb.ch.

Postdoc Computational Population Genetics

A postdoctoral research associate position is available in the Gutenkunst group, in the Department of Molecular and Cellular Biology at the University of Arizona. The Gutenkunst group integrates computational population genomics and systems biology to understand evolution, with a focus on humans. For more information, see <http://gutengroup.mcb.arizona.edu> or contact Dr. Ryan Gutenkunst at rgutenk@email.arizona.edu. Emerging whole-genome data offer both great opportunities and great challenges for understanding the genetic history of natural populations. We seek a quantitatively skilled researcher to develop and apply novel computational methods for inferring demographic history and natural selection from population genomic data. A particular focus will be extending the group's previous work based on diffusion equations (dadi.googlecode.com) and applying the results to whole-genome human data. Candidates should have a Ph.D. in biology, a physical or computational science, or mathematics. Applications should include a C.V., cover letter, and contact information for three references. Please submit applications through <http://www.uacareertrack.com>, job number 49057.

Graduate Assistantship in Biological Networks

PhD in biological networks, Biology Dept., Case Western Reserve University: A graduate assistantship in biological networks is available starting Fall semester, 2012, to work on our NSF funded project Revealing Structure via Dynamics: Biological Networks from Protein Folding to Food Webs. The position is fully funded for one year and we expect no difficulty in extending the grant at least one more year. Beyond that time, there are normally a substantial number of teaching assistantships available in our department for well qualified students. Project co-PIs include an ecologist, a protein physiologist, and an applied mathematician. We seek a student with strong mathematical background to develop an independent research project within the broad context of dynamics on biological networks. For further information: contact Robin Snyder (res29@case.edu, <http://www.cwru.edu/artsci/biol/snyder/>). To apply: Please send a cover letter explaining your interest and suitability for the position, CV, and transcript (unofficial is OK) to res29@case.edu. You must also apply to the Biology graduate program at CWRU.

Postdoc, Mathematical and Computational Biology

The Center for Mathematical and Computational Biology (CMCB) at the University of California, Irvine, is hiring 1-2 postdoctoral scholars. The successful candidates are expected to work with Professor Qing Nie in an interdisciplinary research environment on modeling and simulations of complex biological systems. The research projects are supported by NIH and are closely related to the research themes at UCI's Center for Complex Biological Systems – an NIH National Center of Excellence in Systems Biology. Applicants must possess a PhD in either Mathematics, Physics, Engineering, Computer Science, Biology or related fields. Appointments will be effective on July 1, 2012 or later. For further inquiry on the positions, please contact Qing Nie (qnie@math.uci.edu). Please Reference Job #5494 in subject line of all correspondence. Completed applications must be submitted electronically through <http://www.mathjobs.org>. The review process will start in January 2012 and will continue until the positions are filled.

Postdoc, Multiscale Image Based Homogenisation and Modelling

A post doctorate research fellow is required to work on multiscale image based modelling and homogenization of water flow in soil and water uptake by plant roots. This post is part of a large BBSRC funded program to develop models of water uptake by wheat crop to learn about the multiscale mechanisms that control the plant-water relations. This project will combine multiscale x-ray CT scanning imaging of soil and plant roots (undertaken in Nottingham and Southampton) with the state of the art image based multiscale homogenisation of water movement and uptake in the soil. The work will be performed in the Bioengineering Group at the University of Southampton, but will require close collaboration with x-ray CT scanning facility in the University of Nottingham and muVIS in Southampton. <http://www.southampton.ac.uk/engineering/research/groups/bioeng.page> For further details, please contact: Dr. Tiina Roose, t.roose@soton.ac.uk. Please apply online through: www.jobs.soton.ac.uk. Please quote vacancy reference number 069911BX on all correspondence.

Postdoc - Phylogenetics & Green Algal Biodiversity

The project will collect a large, next-gen sequence database tracking the growth of cells through the growth curve, and will incorporate elements of systematics, evolution, cell biology, and systems biology, and there are complex and fascinating mathematic and statistical problems involved. We seek highly a motivated postdoctoral researcher to participate in an NSF-funded, collaborative research projects studying biodiversity and systematics in green algae, working in the laboratory of Dr. Charles Delwiche at the University of Maryland, College Park. We are using high-throughput sequencing of expressed sequences to study phylogenetics, ecology, and evolution in green algae. A Ph.D. in the biological sciences, bioinformatics, or a related field, and preference will be given to candidates having experience with high-throughput sequencing, and/or sequence analysis, algal/plant biodiversity, or RNA biology. The position is available immediately, and preference will be given to candidates who will be available no later than early 2012. Informal inquiries are encouraged, prior to formal application. To apply formally, please send the following: 1. A curriculum vitae, 2. Names of 3 referees willing to provide a letter of recommendation upon request, 3. A brief statement of how your research goals fit with research on algal biodiversity, systematics, and evolutionary biology. Email applications are preferred, and should be sent to: aaalgeee@gmail.com

Postdoc - National Synthesis Center

SESYNC is the newest NSF funded national synthesis center, hosting researchers to integrate diverse forms of information, data, and models to inspire novel research and provide innovative solutions to socio-environmental problems. Through its diverse programs, the center invites researchers

from across the globe to work on site at the SESYNC headquarters in Annapolis. Applications are being accepted for Postdoctoral Fellowships. Researchers with expertise and ideas to employ integrative, analytical, computational, or informatic approaches focused on the structure, functioning, and sustainability of socio-environmental systems are invited to apply. Applicants may have received their PhD in ANY relevant area of research including anthropology, ecology, economics, education, geography, mathematics, statistics, computer science, political science, public policy, planning, etc. Applications for post-doctoral fellows are due January 31, 2012. Please www.sesync.org for more information on these fellowships and also funding opportunities under our other research programs

Science Policy Opportunity for Graduate Students

Applications are now being accepted for the 2012 AIBS Emerging Public Policy Leadership Award (EPPLA). This award recognizes graduate students in the biological sciences who have demonstrated initiative and leadership in science policy. EPPLA recipients receive first-hand experience at the interface of science and public policy. EPPLA winners receive a trip to Washington, DC, to participate in the Biological and Ecological Sciences Coalition (BESC) Congressional Visits Day, an annual event that brings scientists to the nation's capital to advocate for federal investments in the biological sciences, with a primary focus on the National Science Foundation. The 2012 award is open to U.S. citizens enrolled in a graduate degree program in the biological sciences, science education, or closely allied field. Applicants should have a demonstrated interest in and commitment to science policy and/or science education policy. More information available: http://www.aibs.org/public-policy/student_opportunities.html. Please direct questions to publicpolicy@aibs.org.



The Society for Mathematical Biology Annual Meeting and Conference

July 26-28, 2012

Location: Knoxville Convention Center

<http://nimbios.org/SMB2012/>

Mathematics and Biology: Interdisciplinary Connections and Living Systems

The Future of Math Biology



Shuan Strohm
University of British Columbia
Rebecca Tyson Lab

What attracted you to mathematical biology? I have been fortunate to work with a number of different students and professors in Mathematical Biology, both at UBC Okanagan

and through intensive summer courses at other universities. I really enjoy working on mathematical problems that can help answer questions about biological systems, and there are so many interesting application areas in mathematical biology! From disease spread to predator-prey systems, immune system dynamics to the development of cellular structure, the list of biological problems which can be informed by mathematical models is endless.

What is your current research project? My current research project is spatially modeling the dispersal of Mountain Pine Beetle. I am working in collaboration with researchers at the University of Calgary and Banff National Park .

What specific areas are you interested investigating? My project is investigating how different management activities, such as prescribed burning and intensive baiting and removal strategies affect the beetle survival and dispersal. I have developed a reaction-diffusion chemotaxis model for beetle dispersal, and a discrete difference equations for reproduction and overwinter survival.

What do you hope to do after graduation? After I finish my graduate work, I plan to apply for post-doctoral and faculty positions at various universities. I plan to continue research in the field of spatial modeling and predator-prey systems.

What advice will you give to an undergraduate interested in a mathematical biology career? For any system that you want to model, build competing models, so that you can evaluate the impact that any particular model has on the conclusions you draw from your work.

What inspires you scientifically? I am scientifically driven by my interest in the application area and the impact my work can have on management of the biological systems I model.

Why did you join the Society for Mathematical Biology? I joined the Society for Mathematical Biology to network with other mathematical biologists with similar interests.

Rebecca Tyson, Shaun's PhD advisor, says: "Shaun is a very bright student and a gifted teacher who discovered Mathematical Biology when he first started working in my lab as an undergraduate. He took to the field very quickly, and is a joy to work with. I know that he's excited about the field, loves talking about research with others, and also loves outreach work with his peers and junior students. He is also a wonderful resource for me, as he is very helpful to all of the students in my lab, taking some of the pressure off me. Shaun is also a very well-rounded person, with interests in hockey, lacrosse and youth development. He is a marvellous ambassador for my lab, and for the field of mathematical biology."

Nominate your student!

"The Future of Math Biology" is a new column intended to highlight graduate students in mathematical biology. Do you want to nominate a student from your research group? Please send your nomination to: schnells@umich.edu.

Editor's Notes:

We invite submissions including summaries of previous mathematical biology meetings, invitations to upcoming conferences, commentaries, book reviews or suggestions for other future columns. The deadline is the 15th of the month prior to publication.

The SMB Newsletter is published in January, May and September by the Society for Mathematical Biology for its members. The Society for Mathematical Biology is an international society that exists to promote and foster interactions between the mathematical and biological sciences communities through membership, journal publications, travel support and conferences. Please visit our web site: <http://www.smb.org> for more information.

Holly Gaff, Editor, editor@smb.org