# *Schedule*

## Tuesday, July 31

| | | | | | | |
|---|---|---|---|---|---|---|
| 8:15-8:30 am | Welcome and opening remarks<br>**Club Regent** | | | | | |
| 8:30-9:30 am | Plenary Talk 1: Alan Hastings, University of California at Davis<br>*Mathematical approaches to the management of spatial populations*<br>**Club Regent** | | | | | |
| 9:30-10:00 am | Morning Coffee Break | | | | | |
| 10:00-12 noon | MS 1:<br>*Regime shifts in Aquatic Ecosystems*<br>**Club Regent** | MS 2:<br>*Chemotaxis and Control, Session I*<br>**Atherton** | CT 1:<br>*Immunology*<br>**Belvedere** | CT 2:<br>*Ecology I*<br>**Cupertino** | CT 3:<br>*Cancer I*<br>**Fairfield** | CT 4:<br>*Cellular Biology*<br>**Glen Ellen** |
| 12noon-1:30 pm | Lunch Break | | | | | |
| 1:30-2:30 pm | Plenary Talk 2: Yasuhiro Takeuchi, Shizuoka University<br>*Mathematical models of avian influenza epidemic: What policy should we choose?*<br>**Club Regent** | | | | | |
| 2:30-3:00 pm | Afternoon Tea Break | | | | | |
| 3:00-5:00 pm | MS 3:<br>*Invertebrate Control*<br>**Club Regent** | MS 4:<br>*Chemotaxis and Control, Session II*<br>**Atherton** | MS 5:<br>*Topology Bionetworks*<br>**Belvedere** | CT 5:<br>*Ecology II*<br>**Cupertino** | CT 6:<br>*Cancer II*<br>**Fairfield** | CT 7:<br>*Epidemiology I*<br>**Glen Ellen** |
| 5:00-6:00 pm | Okubo Prize Lecture<br>**Club Regent** | | | | | |
| 6:00-8:00 pm | JSMB General Assembly<br>**Club Regent** | | | | | |

## Wednesday, August 1

| | | | | | | |
|---|---|---|---|---|---|---|
| 8:30-9:30 am | Plenary Talk 3: Helen Byrne, University of Nottingham<br>*Modelling Solid Tumour Growth: Getting the Balance Right?*<br>**Club Regent** | | | | | |
| 9:30-10:00 am | Morning Coffee Break | | | | | |
| 10:00-12 noon | MS 6:<br>*Cancer Radiotherapy*<br>**Club Regent** | MS 7:<br>*Biochemical Reaction Networks Session I*<br>**Atherton** | MS 8:<br>*Inverse Problems*<br>**Belvedere** | CT 8:<br>*Ecology III*<br>**Cupertino** | CT 9:<br>*Genetics and Molecular Biology*<br>**Fairfield** | CT 10:<br>*Epidemiology II*<br>**Glen Ellen** |
| 12 noon-1:30 pm | Lunch Break | | | | | |
| 1:30-2:30 pm | Plenary Talk 4: Akira Sasaki, Kyushu University<br>*Host-parasite arm races: Coevolutionary cycles, unilateral disarmaments, and the correlated geographical clines in resistances and countermeasures*<br>**Club Regent** | | | | | |
| 2:30-3:00 pm | Afternoon Tea Break | | | | | |
| 3:00-5:00 pm | MS 9:<br>*NSF-UBM Undergrad Training Programs*<br>**Club Regent** | MS 10:<br>*Biochemical Reaction Networks Session I*<br>**Atherton** | MS 11:<br>*Computational and Mathematical Epidemiology*<br>**Belvedere** | CT 11:<br>*Evolution I*<br>**Cupertino** | CT 12:<br>*Cancer III*<br>**Fairfield** | CT 13:<br>*Developmental Biology*<br>**Glen Ellen** |
| 5:30-7:30 pm | Barbeque Dinner<br>JSMB Standing Committee meeting (at the dinner)<br>**San Jose State University campus** | | | | | |

# *Schedule*

## Thursday, August 2

| | | | | | | |
|---|---|---|---|---|---|---|
| 8:30-9:30 am | Plenary Talk 5: Gerda de Vries, University of Alberta<br>*Modelling the spatio-temporal dynamics of nuclear proteins*<br>**Club Regent** | | | | | |
| 9:30-10:00 am | Morning Coffee Break | | | | | |
| 10:00-12 noon | MS 12:<br>*Chemostat and Biodiversity*<br>**Club Regent** | MS 13:<br>*Morphogenesis and Pattern Formation*<br>**Atherton** | MS 14:<br>*Evolution of Cooperation and Human Altruism*<br>**Belvedere** | CT 14:<br>*Ecology IV*<br>**Cupertino** | CT 15:<br>*Neurology and Systems Biology*<br>**Fairfield** | CT 16:<br>*Epidemiology III*<br>**Glen Ellen** |
| 12 noon-1:30 pm | Lunch Break | | | | | |
| 1:30-2:30 pm | Plenary Talk 6: H.T. Banks, North Carolina State University<br>*HIV Models: Cellular to Systemic*<br>**Club Regent** | | | | | |
| 2:30-3:00 pm | Afternoon Tea Break | | | | | |
| 3:00-5:00 pm | MS 15:<br>*Optimal Cancer Treatments*<br>**Club Regent** | MS 16:<br>*Undergraduate Biomath Research programs*<br>**Atherton** | MS 17:<br>*Eco-epidemiology*<br>**Belvedere** | CT 17:<br>*Ecology V*<br>**Cupertino** | CT 18:<br>*Physiology*<br>**Fairfield** | CT 19:<br>*Biochemistry and Bioinformatics*<br>**Glen Ellen** |
| 5:00-6:00 pm | SMB General Meeting | | | | | |
| 6:00-7:30 pm | Poster session<br>**Crystal Room** | | | | | |
| 7:30- | Banquet<br>**Regency** | | | | | |

## Friday, August 3

**Please note the altered schedule to accommodate MathFest**

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|---|---|---|---|---|
| 8:30-9:20 am | Plenary Talk 7: Joint MAA-SMB Invited Address-<br>Carlos Castillo-Chavez, Arizona State University<br>*On the Dynamics and Evolution of Emergent and Re-Emergent Diseases: From Tuberculosis to SARS to the Flu*<br>**Regency** | | | |
| 9:30-10:20 am | Plenary Talk 8: MAA Invited Address-<br>Louis J. Gross, University of Tennessee<br>*Managing Natural Resources: Mathematics Meets Politics, Greed, and the Army Corps of Engineers*<br>**Regency** | | | |
| 10:30-11:30 am | Career Workshop: How to get a tenure-track job<br>**Atherton** | | Women's issues discussion<br>**Belvedere** | |
| 11:30am-1:00 pm | Lunch Break | | | |
| 1:00-2:40 pm | MS 18:<br>*Develpmental Phenomena*<br>**Belvedere** | CT 20:<br>*Ecology VI*<br>**Cupertino** | MS 19:<br>*Adaptive Speciation Meets Population Genetics*<br>**Fairfield** | CT 21:<br>*Evolution II*<br>**Glen Ellen** |
| 3:00-4:40 pm | MS 20:<br>*Ecological Networks*<br>**Belvedere** | CT 22:<br>*Ecology VII*<br>**Cupertino** | MS 21:<br>*Circadian Rhythms*<br>**Fairfield** | CT 23:<br>*Epidemiology IV*<br>**Glen Ellen** |
| 4:30-5:30 pm | SMB/MAA reception<br>**poolside** | | | |

# *Detailed Program*

## Tuesday, July 31

8:15 am Welcome and opening remarks

8:30 am Plenary Talk 1:
Alan Hastings
*Mathematical approaches to the management of spatial populations*

9:30 am Coffee break

***10:00-12:00 am***

**MS 1: How can we cope with regime shifts in aquatic ecosystems?**
Organizer: Takashi Amemiya

10:00 am Takashi Amemiya
*Mathematical model of algal blooms with colony formation by phenotypic plasticity*
10:30am Motomi Genkai-Kato
*Eutrophication of lakes in relation to lake morphometry, water temperature, and macrophytes*
11:00 am Hisao Nakajima,
*Mathematical Models of the Regime Shift in Aquatic Ecosystems*
11:30 am Garry Peterson
*Learning to cope with surprising regime shifts*

**MS 2: Mathematical Models of Biological Communication, Chemotaxis & Control (Session I)**
Organizer: Peter J. Thomas

10:00 am Daniel Irimia, Gabor Balazsi and Mehmet Toner
*Neutrophil Responses to Temporal Perturbations of Chemotactic Gradients in Microfluidic Devices*
10:30 am Adriana Dawes
*Spatial regulation of actin polymerization in a 1D model of a motile cell by phosphoinositides and small G proteins*
11:00 am Liu Yang
*Modeling cellular deformations during chemotaxis using level set methods*
11:30 am Gheorghe Craciun
*Intracellular Communication and Cellular Differentiation in Filamentous Cyanobacteria*

**CT 1: Immunology**

10:00 am Hancioglu, Baris
*A dynamical model of influenza A virus infection: clinical and epidemiological relevance*
10:20 am Iwami, Shingo
*Dynamical properties of autoimmune disease models: tolerance, flare-up, dormancy*
10:40 am Heffernan, Jane
*An in-host model of acute infection: A look at Measles*
11:00 am Bansal, Shweta
*Network frailty and the geometry of herd immunity*
11:20 am Sepulveda, Nuno
*How diverse are regulatory T cells that protect an organism against autoimmunity*

**CT 2: Ecology I**

10:00 am Yamauchi, Atsushi
*Intraspecific niche flexibility facilitates species coexistence in a competitive community with a fluctuating environment*
10:20 am Seto, Mayumi
*Coexistence introducing regulation of environmental conditions*
10:40 am Yoshino, Yoshimi
*A model ecosystem of resource competition and random interaction*

# *Detailed Program*

11:00 am Walton, Brian
*Optimal Allocation Strategies for Multiple Constrained Resources*
11:20 am Walton, Brian
*Ratcheting Up a Fluctuating Environment*
11:40 am Kelrick, Michael
*Unlikely "gladefellows": facilitation of a rare annual herb (Missouri bladderpod, Lesquerella filiformis) by an invasive native tree (Eastern red cedar, Juniperus virginiana)*

**CT 3: Cancer I**
10:00 am Osborne, James
*Towards a Generic Numerical Method for Simulating Avascular Tumour Growth in Three Dimensions*
10:20 am Monro, Helen
*The Incorporation of Non-Linear Tumour Growth Models within the Simulation of Chemotherapy Protocol Scheduling*
10:40 am Lo, CF
*A stochastic Gompertz model of tumor cell growth*
11:00 am Murray, Philip
*Modelling the role of the cell cycle in tumour growth*
11:20 am Mirams, Gary
*A Lattice-Free Model of Early Colorectal Cancer*
11:40 am Jones, Tiffany
*Computational Modelling of Cancer Growth*

**CT 4: Cellular Biology**
10:00 am Xue, Chuan
*On the streams formation in bacteria Proteus mirabilis colonies*
10:20 am Ventura, Alejndra
*Signaling cascades: a hidden feedback is revealed*
10:40 am Gerlee, Philip
*Stability Analysis of a Hybrid Cellular Automaton Model of Cell Colony Growth*
11:00 am Xin, Siangrong (Benny)
*A 'trimer of dimers' based model for chemotaxis in Escherichia coli*

12:00pm Lunch break

1:30pm Plenary Talk 2:
Yasuhiro Takeuchi
*Mathematical Models of avian influenza epidemic: what policy should we choose?*

2:30 pm Afternoon Tea break

***3:00-5:00 pm***

**MS 3: Mathematical modelling of invertebrate control**
Organizers: Christina Cobbold and Caroline Bampfylde
3:00pm Caroline Bampfylde
*Biological control through intraguild predation: what is the most efficient control method?*
3:30pm Martin Bees
*Slug dynamics and biocontrol: three approaches*
4:00pm Cherie Briggs
*Control of California red scale by the parasitoid, Aphytis melinus: simple models and experiments*
4:30pm Holly Gaff
*Modeling tick-borne diseases: a metapopulation model*

# *Detailed Program*

**MS 4: Mathematical Models of Biological Communication, Chemotaxis & Control (Session II)**
Organizer: Peter J. Thomas

3:00pm Paul C. Bressloff
*Mathematical Models of Protein Receptor Trafficking and Its Role in Synaptic Plasticity*

3:30pm Tatsuo Shibata
*Noisy signal processing in chemotactic response of Eukaryotic cell*

4:00pm Jeff Hasty
*Engineered Gene Circuits*

4:30pm Peter Thomas
*Information Theoretic Analysis of Eukaryotic Gradient Sensing*

**MS 5: Topology Bionetworks**
Organizer: Hawoong Jeong

3:00 pm Erzsebet Ravasz
*Network Structure of Protein Folding Pathways*

3:30 pm Pan-Jun Kim
*Metabolite-essentiality elucidates robustness of Escherichia coli metabolism*

**CT 5: Ecology II**

3:00 pm Nakazawa, Takefumi
*Resting eggs of zooplankton and the paradox of enrichment: Dose an alternative reproductive strategy adapted for food deficiency stabilize a predator-prey system?*

3:20 pm Iwasa, Yoh
*Nonlinear behavior of the socio-economic dynamics: examples of lake eutrophication and deforestation*

3:40 pm Suzuki, Yukari
*Prevention of regime shift in lake system using the coupled dynamics of human socio-economic choice and lake system in water pollution problem*

4:00 pm Chon, Tae-Soo
*Species abundance patterns in benthic macroinvertebrate communities illustrated by the power law across different levels of pollution*

**CT 6: Cancer II**

3:00 pm Tarfulea, Nicoleta
*A hybrid mathematical model for in vitro tumor-induced angiogenesis*

3:20 pm Jain, Harsh
*Anti Bcl-2 Therapy in Intratumoral Angiogenesis*

3:40 pm Mistry, Hitesh
*An idealized model of Aurora kinase's interaction on the spindle assembly checkpoint*

4:00 pm Heusel, Sara
*Mutation Acquisition and Tumorigenesis: Modeling the Emergence of Cancer Stem Cells within Hierarchical Tissue*

4:20 pm Cristini, Vittorio
*Computational modeling identifies morphologic predictors of tumor invasion*

**CT 7: Epidemiology I**

3:00 pm Tildesley, Mike
*Modelling spread of Foot-and-Mouth Disease in Pennsylvania*

3:20 pm Egan, Joseph
*Contingency planning for a smallpox outbreak using a spatial metapopulation model*

3:40 pm Sutton, Karyn
*The Impact of Vaccination on Pneumococcal Disease Dynamics*

4:00 pm Wagner, Bradley
*Circulating Vaccine Derived Polio Viruses and their Impact on Global Polio Eradication*

4:20 pm Meade, Douglas
*Vaccination Strategies for an SEIQR Model for an Infectious Disease*

4:40 pm Salinas, Rene
*Comparing the Effects of Vaccination Strategies and Risk Differentiation on the prevalence of HPV*

5:00 pm Okubo Prize Lecture
6:00 pm JSMB General Assembly

# *Detailed Program*

## Wednesday, August 1

8:15 am Welcome and opening remarks

8:30 am Plenary Talk 1:
Alan Hastings
*Mathematical approaches to the management of spatial populations*

9:30 am Coffee break

***10:00-12:00 am***

**MS 6: Mathematical models of cancer radiotherapy and inter-cellular radiation effects**
Organizers: Heiko Enderling and Philip Hahnfeldt

10:00 am Francesca O'Rourke
*Linear Quadratic and Tumour Control Probability Modelling in External Beam Radiotherapy*

10:30 am Leonid Hanin
*Iterated birth and death Markov process as a model of irradiated cell survival*

11:00 am David J. Brenner
*Understanding Radiotherapy-Induced Second Cancers*

11:30 am Rainer K Sachs
*Second Cancers after Fractionated Radiotherapy: Stochastic Population Dynamics Effects*

**MS 7: Dynamics of Biochemical Reaction Networks Session I**
Organizers: Gheorghe Craciun and Maya Mincheva

10:00 am Maya Mincheva
*Oscillations and Structure of Biochemical Reaction Networks*

10:30 am Patrick de Leenheer
*Multi-strain virus dynamics with mutations: A global analysis*

11:00 am Atsushi Mochizuki
*Structure of regulatory networks and diversity of gene expression patterns*

11:30 am Hong Qian
*Mesoscopic and Macroscopic Open-system Chemical Dynamics*

**MS 8: Inverse Problems in Quantitative Life Sciences**
Organizer: Huseyin Coskun

10:00 am Huseyin Coskun
*An Inverse Problem Formulation for Crawling Cell Motion*

10:30 am David Matthew Bortz
*Model Selection and Mathematical Biology*

**CT 8: Ecology III**

10:00 am Bauch, Chris
*A population biological perspective on declining fertility rates in industrialized countries*

10:20 am Seno, Hiromi
*Interspecific reaction may cause the paradox of pest control*

10:40 am Namba, Toshiyuki
*Diversity and stability in a model community of an herbivore and many plant species*

11:00 am Chaplain, Mark
*Disease induced dynamics in host-parasitoid systems: chaos and coexistence*

11:20 am Whittle, Andrew
*Geographic variation in breeding season length of the Eurasian Collared Dove*

# *Detailed Program*

**CT 9: Genetics and Molecular Biology**

10:00 am Kang, Yeona
*Channel mechanisms for bidirectional and selective neural ionic conduction*

10:20 am Stein, Andy
*Micromechanical Models for 3d Collagen Gels*

10:40 am Smith, Charles
*Complex Demodulation applied to bZIP and bHLH-PAS Protein Domains*

11:00 am Wang, Haiyan
*Enhanced modeling of the regulation of the tryptophan operon in E. coli*

11:20 am Bauer, Chris
*Combining Gene Expression Measurements with Gene Interaction Networks Reveals Potential Mechanisms of Phenotypic Manifestation in Drosophila sti Mutants*

**CT 10: Epidemiology II**

10:00 am Ding, Wandi
*Rabies in Raccoons: Optimal Control for a Discrete Time Model on a Spatial Grid*

10:20 am Stone, Lewi
*Seasonal dynamics of recurrent epidemics: A new synthesis of phase, outbreak occurence and synchronization*

10:40 am Ellen Brooks Pollock
*Cattle movements and contact structure in a model of bovine tuberculosis*

11:00 am Vernon, Matthew
*Representing the United Kingdom's cattle herd as static and dynamic networks*

11:20 am Cojin, Caroline
*A mixed latency two-strain SEIR model with application to tuberculosis*

11:40 am Sharkey, Kieran
*Epidemiological consequences of an incursion of highly pathogenic H5N1 avian influenza into the British poultry flock*

12:00 pm Lunch Break

1:30 pm Plenary Talk 4:
Akira Sasaki
*Host-parasite arm races: Coevolutionary cycles, unilateral disarmaments, and the correlated geographical clines in resistances and countermeasures*

2:30 pm Afternoon Tea break

***3:00-5:00 pm***

**MS 9: Research in NSF Interdisciplinary Undergraduate Biological and Mathematical Sciences Training Programs**

Organizers: Carole L. Hom and Mary Ann Horn

3:00 pm Katherine Dunning
*Effects of Light Intensity on Daphnia Dynamics and Coexistence: A Stoichiometric Perspective*

3:15 pm Adam Carpenter
*Build up of ecosystem function and biodiversity in metacommunities*

3:30 pm Abraham Rosales and Gareth Russell
*Understanding Colonial Wading Bird Metapopulation Dynamics in the NJ Meadowlands and NY Harbor*

3:45 pm Lucas Bohnett
*In Search of the Optimal Quadrat Size and Shape*

4:00 pm Colin Kremer
*Chaotic dynamics lost in small-world network metapopulations*

4:15 pm Judith Kwarteng Amaning
*Functional Genomics of Synechococcus elongates*

4:30 pm William B. Leeds
*Spatiotemporal analyses of the abundance of Missouri bladderpod (Lesquerella filiformis): conservation of a rare plant species on federal land*

4:45 pm Lauren Gillian
*Statistical comparison of phylogeography and biogeography of the Chagas disease parasite and its vector*

# *Detailed Program*

**MS 10: Dynamics of Biochemical Reaction Networks Session II**
Organizers: Gheorghe Craciun and Maya Mincheva

3:00 pm Gheorghe Craciun *Globally stable biochemical reaction networks*
3:30 pm Santiago Schnell *The dynamics of reaction pathways in intracellular conditions*
4:00 pm David Swigon *Dynamical equivalence of chemical reaction networks*

**MS 11: Computational and Mathematical Epidemiology**
Organizer: Yongkuk Kim

3:00 pm Shweta Bansal *Contact network epidemiology and the design of influenza vaccination strategies*
3:30 pm Luis F. Gordillo *Bimodal epidemic size distributions for near-critical SIR with vaccination*
4:00 pm Gerardo Chowell *Transmission and control of influenza epidemics and pandemics*
4:30 pm David Hiebeler *Mixed multiscale infection strategies in hierarchical clustered networks*

**CT 11: Evolution I**

3:00 pm White, Steven
*Evolution versus co-evolution: An example from stage-structured host-parasitoid systems*
3:20 pm Weitz, Joshua
*Stochasticity in the phenotypic dynamics of evolving populations*
3:40 pm Magori-Cohan, Romi
*Estimating underlying biological dymamics from sequence data using graph theoretic measures of clonal trees*
4:00 pm Evans, Thomas
*Adaptive Dynamics of Temperate Phages*
4:20 pm Zheng, Qi
*Tackling Bartlett's formulation of Luria and Delbruck's mutation model*

**CT 12: Cancer III**

3:00 pm Gidea, Marian
*A mathematical model of cancer treatment for albuleukin adoptive immunotherapy*
3:20 pm Enderling,Heiko
*Mathematical modeling of breast cancer radiotherapy – treatment success and failure*
3:40 pm Boston, Eleanor
*The Impact of Toxic Constraints to Predictions of Optimal Chemotherapy Scheduling*
4:00 pm Buminovich, Svetlana
*Immunotherapy treatment of Bladder Cancer: A mathematical model*
4:20 pm Carrero, Gustavo
*Assessing the response of histone H1 variants to the anticancer drug Trichostatin A (TSA) using fluorescence recovery after photobleaching (FRAP) experiments*
4:40 pm Anderson, Alexander
*Microenvironment Driven Tumour Invasion: A Multiscale, Multimodel Investigation*

**CT 13: Developmental Biology**

3:00 pm Yochellis. Arik
*Morphogenesis beyond the Turing onset: From periodic to localized patterms*
3:20 pm Honda, Hisao
*There are two different mechanisms of planar cell-intercalation leading to polarized morphogenesis*
3:40 pm Morishita, Yoshihiro
*A mathematical model for organ growth and deformation: illustrated by vertebrate limb bud formation*
4:00 pm Pearson, Yanthe
*Experimental, Theoretical, Numerical analysis of Neuromorphogenesis*
4:20 pm Uriu, Koichiro
*Synchronized oscillation and traveling wave in vertebrate segmentation*

5:30 pm Barbeque dinner

# *Detailed Program*

## Thursday, August 2

8:30 am Plenary Talk 5:
Gerda de Vries
*Modelling the spatio-temporal dynamics of nuclear proteins*

9:30 am Morning Coffee Break

***10:00-12:00 am***

**MS 12: Chemostat and Biodiversity**
Organizers: Yasuhiro Takeuchi and Hal L. Smith
10:00 am Shinji Nakaoka
*Microbial coexistence mediated by mutual metabolism*
10:30 am Takeshi Miki, Taichi Yokokawa, Toshi Nagata, and Norio Yamamura
*Coexistence and succession in microbial metacommunity: potential linking between spatial heterogeneity in diversity and rapid shifts in community in response to environmental changes*
11:00 am Tufail Malik
*Microbial Quiescence, A Survival Strategy In Environmental Stress*
11:30 am Bingtuan Li
*Global Dynamics of Microbial Competition for two Resources with Internal Storage*

**MS 13: Morphogenesis and Pattern Formation in Biological Systems**
Organizers: Toshio Sekimura and James A. Glazier
10:00 am James A. Glazier
*Cell-level Modeling of Biological Development using the GGH Model and CompuCell3D—Applications, Technology and Open Problems*
10:30 am Takashi Miura
*Mechanism of lung branching morphogenesis*
11:00 am Toshio Sekimura
*Parr mark formation in the early development of Amago trout*
11:30 am R.E. Baker and P.K. Maini
*Propagating pattern formation in developmental biology*

**MS 14: Theoretical models of evolution of cooperation and human altruism**
Organizers: Hisashi Ohtsuki and Joe Yuichiro Wakano
10:00 am Joe Yuichiro Wakano
*Chaotic coexistence of cooperators and defectors in spatial public goods games*
10:30 am Laurent Lehmann
*The good, the bad and the life-history*
11:00 am Mayuko Nakamaru
*Psychological reaction norm of punishment and the evolution of cooperation level*
11:30 am Hisashi Ohtsuki
*Social norms and evolutionary dynamics in indirect reciprocity*

**CT 14: Ecology IV**
10:00 am Adams, Michael
*Graph Decompositions for Demoraphic Loop Analysis*
10:20 am Medvinsky, Alexander
*Chaos and order in spatially extended populations: Mathematical modeling*
10:40 am Rebarber, Richard
*The effect of parameter uncertainty on long-term population growth*
11:00 am Sato, Kazunori
*Neutral theory in ecology with spatial structure*
11:20 am Kon, Ryusuke
*Dynamics of a lottery model and its approximation by ODEs*
11:40 am Rosindell, James
*Species-Area Relationships from a Spatially Explicit Neutral Model in an Infinite Landscape*

# *Detailed Program*

**CT 15: Neurology and Systems Biology**
10:00 am Crook, Sharon
*Modeling Behaviorally Relevant Structural Plasticity in a Motoneuron*
10:20 am Weaver, Christina
*Neuronal Firing Sensitivity to Morphologic and Active Membrane Parameters*
10:40 am Mourao, Marcio
*Optimal experimental design of a reaction inference methodology*
11:00 am Kawachi, Kazuki
*Mathematical analysis of a spatial deterministic model for rumor transmission*

**CT 16: Epidemiology III**
10:00 am Zhao, Ruijun
*An S-I-R Model of Epidemics with Directed Spatial Diffusion*
10:20 am House, Thomas
*Household models of disease epidemics*
10:40 am Eames, Ken
*Social interactions and epidemic dynamics*
11:00 am Singh, Abhyudai
*Stability in host-parasitoid discrete-time models due to variability in host risk*
11:20 am Lee, Young
*On a Model of Peptic Ulcers and H. Pylori with Vaccination*
11:40 am Nevai, Andrew
*A discrete-time SIS patch model*

12:00 pm Lunch Break

1:30 pm Plenary Talk 6:
H.T. Banks
*HIV Models: Cellular to Systemic*

2:30 pm Afternoon Tea break

***3:00-5:00 pm***

**MS 15: Mathematical Approaches to Modeling and Identifying Optimal Cancer Treatments**
Organizers: Lisette de Pillis, K.R. Fister, and W. Gu
3:00 pm Yi Jiang
*Multiscale Modeling of Tumor Development*
3:30 pm Natalia Komarova
*Stochastic modeling of cancer progression and treatment*
4:00 pm K. Kaouri, G. Richardson and H.M. Byrne
*Novel anti-cancer therapies that combine macrophages and magnetic nanoparticles*
4:30 pm John Lowengrub
*Multiscale models of solid tumor growth and angiogenesis: Effect of the Microenvironment*
5:00 pm Kristin Swanson
*Mathematical modeling of radiotherapy in individual glioma patients: Quantifying and predicting response*

**MS 16: Preparation and Engagement of Undergraduates in Biomathematical Research**
Organizer: Timothy D. Comar
3:00 pm Glenn Ledder
*Preparing biology students for interdisciplinary mathematics/biology research*
3:30 pm Michael Martin
*Mathematics in Medicine: Matrices, Models, & Much More!*
4:00 pm Timothy D. Comar
*Attracting, preparing, and mentoring undergraduate students in biomathematical research at a small university*
4:30 pm Olcay Akman
*Mathematics and Biology Student Engagement on Biomathematics Research Projects*

# *Detailed Program*

**MS 17: Coupling epidemiological and ecological predation-competition models (Eco-epidemiology)**
Organizers: Frank M. Hilker and Horst Malchow

3:00 pm Nanako Shigesada
*Stratified colonization in a CA model and its application to the epidemic propagation of pine wilt disease*
3:30 pm Yasuhisa Saito
*Phase-compartment model for transport-related disease infection*
4:00 pm Horst Malchow
*Viral infection in planktonic food chains*
4:30 pm Frank M. Hilker
*Control of invasive cats with FIV: disease spread in predators*

**CT 17: Ecology V**
3:00 pm Loehle, Craig
*An improved control theory technique for the management of fisheries*
3:20 pm Cordova-Lepe, Fernando
*Fishery sustainable regulation by controlling the length of the prohibitions as function of the harvest*
3:40 pm Rebarber, Richard
*Designing Captive Breeding Programs Using Optimal Control*
4:00 pm Matsuda, Hiroyuki
*The tragedy of the free trade: A game analysis*

**CT 18: Physiology**
3:00 pm Hampton, Marshall
*Modeling Mammalian Hibernation*
3:20 pm Lenhart, Suzanne
*Optimal Control Theory Applied to a Difference Equation Model for Cardiopulmonary Resuscitation*
3:40 pm Agyingi, Ehraim
*A mathematical model of epidermal wound healing in the presence of an infection*
4:00 pm Mori, Yoichiro
*A Three Dimensional Model of Cellular Electrical Activity with Applications to Cardiac Physiology*
4:20 pm Dahari, Harei
*Modeling viral hepatitis dynamics: Liver regeneration and critical drug efficacy*

**CT 19: Biochemistry and Bioinformatics**
3:00 pm Srividhya, J.
*Method for Inference of Kinetics And Network Architecture (MIKANA)*
3:20 pm Flach, E.H.
*Determining kinetics parameters in open pathways by moving the steady state*
3:40 pm Lee, Chang Hyeong
*Multi-Time-Scale Analysis of Biochemical Reaction Networks*
4:00 pm Joo, Jaewook
*Roles of two coupled negative feedback loops on dynamic patterns of NF-ā̈ppaB signaling*
4:20 pm Hanson, Sonya
*The Reactant Stationary Approximation in enzyme kinetics*
4:40 pm Garlick, Martha
*Mathematically Modeling PCR: An Asymptotic Approach*

5:00 pm SMB General Meeting

6:00 pm Poster session

7:30 pm Banquet

# *Detailed Program*

## Friday, August 3

8:30 am Plenary Talk 7:
Carlos Castillo-Chavez
*On the Dynamics and Evolution of Emergent and Re-Emergent Diseases: From Tuberculosis to SARS to the Flu*

9:30 am Plenary Talk 8:
Louis J. Gross
*Managing Natural Resources: Mathematics Meets Politics, Greed, and the Army Corps of Engineers*

10:30-11:30 am Career Workshop: How to get a tenure-track job
(Graduate students and post-docs only, please.)

10:30-11:30 am Women's issues discussion

11:30 am Lunch Break

***1:00-2:30 pm***

**MS 18: Understanding developmental phenomena by collaborations between experimental and mathematical biology**
Organizers: Takashi Miura and Atsushi Mochizuki

1:00 pm Hiroyuki Takeda
*Coupling cellular oscillators in vertebrate segmentation*
1:30 pm Kaoru Sugimura
*Self-organizing Mechanism for Development of Space-filling Dendrites*
2:00 pm Shigenori Nonaka
*Symmetry break in mammalian development: Left-right determination*

**MS 19: Adaptive speciation theory meets population genetics**
Organizer: Akira Sasaki

1:00 pm Ulf Dieckmann
*Adaptive speciation: Recent insights and future challenges*
1:30 pm Reinhard Bürger
*Population-genetic models of frequency-dependent selection*
2:00 pm Akira Sasaki
*A new quantitative genetics theory for adaptive speciation: Oligomorphic dynamics*

**CT 20: Ecology VI**

1:00 pm Pachepsky, Leeza
*What demographic traits regulate plant invasions in patchy environments?*
1:20 pm Snyder, Robin
*How long are the transient dynamics when a disturbance regime is altered?*
1:40 pm Dugaw, Chris
*Models of road facilitated biological invasions*
2:00 pm Kawasaki, Kohkichi
*An integrodifference model for biological invasions in a periodically fragmented environment*

# *Detailed Program*

**CT 21: Evolution II**

1:00 pm Takasu, Fugo
*The importance of clutch characteristics and learning for anti-parasite adaptations in hosts of avian brood parasites*

1:20 pm Ihara, Yasuo
*Exaggeration of costly prestige-seeking behavior by cultural evolution*

1:40 pm Haeno, Hiroshi
*Resistance evolution of growing virus in the host.*

2:00 pm Yurk, Brian
*Evolution of insect phenology in the presence of environmental variability*

2:20 pm Rychtar, Jan
*Evolution of kleptoparasitism*

## Friday, August 3

***2:30-4:30 pm***

**MS 20: Ecological Networks: Issues, advances, and opportunities**

Organizers: Caner Kazanci and Stefano Allesina

2:30 pm Jordi Bascompte
*Interaction strength combinations in ecological networks*

3:00 pm Ferenc Jordán
*Key nodes in weighted ecological networks*

3:30 pm Stefano Allesina
*Potential Niches and Forbidden Links Explain the Structure of Food Webs*

4:00 pm Caner Kazanci and Ernest William Tollner
*Particle Tracking: A high-resolution stochastic method for Ecological Network Analysis*

**MS 21: Molecular Clocks of Circadian Rhythms**

Organizer: Atsushi Mochizuki

2:30 pm Tokitaka Oyama
*The cyanobacterial circadian clockwork made of three Kai proteins*

3:30 pm Arun Mehra, Christian I. Hong, Mi Shi, Jennifer J. Loros, Jay C. Dunlap, Peter Ruoff
*Circadian Rhythmicity by Autocatalysis*

4:00 pm Atsushi Mochizuki
*Predicting Regulation of the Phosphorylation Cycle of KaiC Clock Protein*

4:30 pm Gen Kurosawa, Kazuyuki Aihara, Yoh Iwasa
*A model for circadian rhythms of cyanobacteria that maintains oscillations in vitro and in vivo*

**CT 22: Ecology VII**

2:50 pm Lukeman, Ryan
*A self-propelled particle model of schooling formations*

3:10 pm Tongen, Anthony
*Discrete Models of Two-gender Populations*

3:30 pm Strasser, Carly
*Stochastic disturbance and the impact of high and low quality patches on metapopulation growth rate*

3:50 pm Goldwyn, Eli
*When Can Dispersal Synchronize Populations?*

# *Detailed Program*

**CT 23: Epidemiology IV**

2:50 pm Gerberry, David
*Bifurcations in an SEIQR Model for Childhood Diseases*

3:10 pm Macula, Tony
*Uniform vs. hubs vaccination strategy for 2-D small-world network lattices with a underlying taxicab metric neighborhood structure*

3:30 pm Dimitrov, Dobromir
*Integration of immunity in multi-level modeling of infectious diseases in wild mammals*

3:50 pm Leary, Christopher
*Influenza Dynamics on Scale Free and College Social Networks*

4:10 pm Tridane, Abdessamad
*An epidemic model with distributed length treatment of exposed but uninfected individuals*

4:30 pm SMB/MAA reception