Curriculum Vitae - Jacob Bellman

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Education

University of Cincinnati:

(2010 - Present) Ph.D. candidate in Applied Mathematics
(2010 - May 2015) M.S. in Mathematics, received May 2015. GPA: 3.85.

Miami University of Ohio:

(2006 - 2010) B.S. in Mathematics and Statistics, received May 2010. GPA: 3.7.

Research Experience

(2013-Present) Dissertation Research, University of Cincinnati

Title: Phase Response Analysis of Circadian Oscillators.
Advisors: Dr. Sookkyung Lim, Mathematics, UC and Dr. Christian Hong, Biology, UC.
Goal: Develop a fundamental understanding of the dynamics of phase resetting in circadian rhythms.
Progress: Have created and analyzed phase response curves for 6 circadian rhythm models, including a unique model which has undergone parameter selection and sensitivity analysis via bifurcation analysis. Numerical computations were done in XPPAUT, MATLAB, and Python. Physical experimentation is currently in progress in which phase response curves are being developed for the fungus *Neurospora crassa* by pulsing with light as well as over-expressing *frq* transcription and measuring conidia banding and luciferase data.

(2012-Present) University of Cincinnati

Title: Identification of Ion Channel Distributions in Frog Olfactory Cilia.
Advisor: Dr. Donald French, Mathematics Professor, UC.
Goal: Solve inverse problem for CNG ion channel distribution.
Progress: Developing a coupled model of cAMP diffusion for numerical simulations in MATLAB.

(Summer 2008) Miami University:

Title: Investigating Hopf Bifurcations in the Mechanical Clock Escapement Problem.
Award: 12 credit hours and $3000 stipend.
Advisors: Dr. Olga Brezhneva (Mathematics), Dr. Amit Shukla (Engineering).
Project Description: Developed a nonlinear ordinary differential equations model for a clock system. Simulated effects of parametric alteration in a mechanical system using MATLAB. Created a clock escapement for experimenting in conjunction with simulation results.

Honors and Awards

University of Cincinnati:

(August 2014-Present) NIH T32 Training Grant.
(Summer, 2014) Maita Levine Summer Research Fellowship.
(2013-2014) DARPA Biochronicity Project, Research Fellowship.
(Summer, 2013) DARPA Biochronicity Project, Summer Research Fellowship.
(2010-2013) Graduate Assistantship.

Miami University:

(2010) Graduated Cum Laude.
(2009-2010) Full Scholarship.
(2006-2010) Dean's List.
(2008) Undergraduate Summer Scholars Research Award.
(2006-2008) Partial Scholarship.

Workshops

1. (Summer, 2014) Attended the MBI-CAMBAM-NIMBioS Summer Graduate Program, The Ohio State University. Wrote a report on cell cycle dynamics with the assistance of John Tyson. The report included a brief survey of developed models used in simulating molecular cell cycle components, as well as an analysis of simple cell cycle models including synchronization of cell cycles through circadian entrainment and counteractive effects of circadian input and mass control.

2. (Summer, 2013) Attended the SAMSI Industrial Math/Stat Modeling Workshop for Graduate Students, North Carolina State University. Conducted data analysis on an extremely large set of microbial data from individuals experiencing asthma symptoms. Correlations between microbial environments and asthma development were sought operating under the assumption that the hygiene hypothesis is accurate.

Poster Presentations

1. (Spring, 2015) Phase Response Analysis of the Circadian Clock in *Neurospora crassa*, **Jacob Bellman**, Dr. Chris Hong, Dr. Sookkyung Lim, Graduate Poster Forum, UC.

2. (Spring, 2014) Phase Response Analysis of the Circadian Clock in *Neurospora crassa*, **Jacob Bellman**, Dr. Chris Hong, Dr. Sookkyung Lim, Graduate Poster Forum, UC.

3. (Spring, 2014) Phase Response Analysis of the Circadian Clock in *Neurospora crassa*, **Jacob Bellman**, Dr. Chris Hong, Dr. Sookkyung Lim, Systems Biology Program Retreat, UC.

Oral Presentations

1. (Spring, 2014) Phase Response Analysis of the Circadian Clock in *Neurospora crassa*, **Jacob Bellman**, Dr. Chris Hong, Dr. Sookkyung Lim, Systems Biology Program Retreat, UC.

2. (Fall, 2013) Phase Response Analysis of the Circadian Clock in *Neurospora crassa*, **Jacob Bellman**, Dr. Chris Hong, Dr. Sookkyung Lim, Mathematical Biology Seminar, UC.

3. (2009) Investigating Hopf Bifurcations in the Mechanical Clock Escapement Problem, **Jacob Bellman** and Cory Sellers, Undergraduate Research Forum, MU.

4. (2009) Investigating Hopf Bifurcations in the Mechanical Clock Escapement Problem, **Jacob Bellman** and Cory Sellers, Pi Mu Epsilon Conference, MU.

Teaching Experience

University of Cincinnati

Instructor: (Summer 2012) Linear Algebra, (Summer 2011) Calculus I.
Graduate Assistant: (2010-2013) Differential Equations, Calculus 0-III.
Tutor: (2013) SRS Tutoring Program.
Tutor: (2010-2013) Math Learning Center.
WebAssign Administrator: (2012-2013) Calculus I/II.

Miami University

Head Tutor: Rinella Learning Center (2009-2010).
Tutor: Rinella Learning Center (2007-2010).

Association Memberships

(2011-2012) Vice President of MSGA, Department of Mathematical Sciences, UC.
(2008-2009) Vice President of Pi Mu Epsilon Math Honorary Society, Miami University.
(2010-Present) Member, American Mathematical Society.
(2014-Present) Member, Society for Industrial and Applied Mathematics.

References

Dr. Sookkyung Lim, Professor of Mathematics, UC, limsg@ucmail.uc.edu.
Dr. Christian Hong, Professor of Molecular and Cellular Physiology, UC, christian.hong@uc.edu.
Dr. Benjamin Vaughan, Professor of Mathematics, UC, benjamin.vaughn@uc.edu.
Dr. Donald French, Professor of Mathematics, UC, donald.french@uc.edu.
Dr. Olga Brezhneva, Professor of Mathematics, MU, brezhnoa@muohio.edu.