

January 25, 2015

Kristin Swanson
Swanson Laboratory
Northwestern University
676 North Saint Clair Street
Suite 1300
Chicago, IL, 60611

Dear Prof. Swanson:

I am writing to apply for the Post Doctorate Research Position that I learned about from my advisor, Prof. Bruce P. Ayati. I am a PhD candidate in the applied mathematics department at the University of Iowa, expecting to graduate in August 2015. I also expect to complete a Masters degree in biostatistics in May 2015.

For the last four years I have worked as a research assistant in the Orthopaedic Cell Biology Lab. My research develops mathematical models of the formation of cartilage lesions, with the goal of obtaining a better understanding about the development of osteoarthritis. I have built reaction-diffusion-delay models and age-and-space-structured models to describe the inflammatory response in articular cartilage to injury. We used a wide-variety of computational methods to solve model equations, estimate computational errors, and examined the sensitivity of numerical results to parameter selections. Beyond mathematical modeling, I analyzed immunohistochemical images using cell segmentation techniques, and used the results to empirically validated our model. In order to improve the predictions of our current models, I have began work on a biostatistical project of converting our cartilage models into state-space models and estimating the unknown parameters from experimental data.

As part of my research, I have worked closely with scientists, engineers and biostatisticians. In order to communicate with people in different areas and give presentations to a wide variety of audiences, I have practiced using a variety of visual tools. During a six-week entrepreneurial training program, I improved my communication skills by conducting more than 30 face-to-face or phone interviews with oncologists, pathologists, and insurance specialists, and competed to win funding for my proposed start-up business by making weekly presentations.

I am keenly interested in joining your lab and getting a new start on cutting-edge research. I am eager to further my career in mathematical biology and interested in the research of great medical importance - Swanson lab can offer me this opportunity. I hope my skills and experience can contribute to your lab, too. Attached you will find my curriculum vitae, and a list of references. Please contact me if you need any further information. Thank you for your consideration.

Sincerely,



Xiayi (Sherry) Wang
Applied Mathematical and Computational Science
University of Iowa, Iowa City, IA 52242
Cell: (319) 631-9385 (cell)
Email: xiayi-wang@uiowa.edu

Xiayi Wang

Present Address

620 12th Ave Apt 4
Coralville, IA 52241
(319) 631-9385
wangxiayi44@gmail.com
www.linkedin.com/in/xiayiwang

Office Address

B20J MacLean Hall
University of Iowa
Iowa City, IA 52242
(319) 335-3650
xiayi-wang@uiowa.edu

Education

Ph.D. in Applied Math and Computational Science August 2015 (expected)
University of Iowa Advisor: Prof. Bruce. P. Ayati
Concentration: Mathematical Biology

Master in Biostatistics May 2015 (expected)
University of Iowa Advisor: Prof. Gideon K. D. Zamba

Master and Bachelor in Mathematics July 2009, July 2006
Sichuan University, China Advisor: Prof. Shiqing Zhang

Experience

Research Assistant January 2013 - August 2015
Department of Orthopedics & Rehabilitation, University of Iowa

- Interfaced with biologists, engineers, and biostatisticians to build mathematical models of articular cartilage lesions.
- Debugged and extended C/C++ solver for the mathematical models, and wrote programs in MATLAB and R to simulate models and visualize results.
- Performed image processing in MATLAB to cluster cell types in lab images, and analyzed the data to validate cartilage models.
- Organized group meetings with collaborators, and participated and presented at Mathematical Biology and Numerical Analysis seminars.

Master Program in Biostatistics August 2014 - May 2015
Department of Biostatistics, University of Iowa

- Built state-space models to predict the formation of cartilage lesions, and applied biostatistical methods to estimated parameters of the models (in progress).
- Wrote an R package to implement the Pareto distribution, and interfaced C with this package.
- Conducted a survival analysis study of data from lymphoma patients.

Venture School Fall 2013
Iowa Centers of Enterprise, University of Iowa

- Participated in a six-week entrepreneurial training program to win funding for a medical consultant start-up business.
- Conducted more than 30 face-to-face or phone interviews with oncologists, pathologists, and insurance specialists.
- Made weekly presentations to business consultants and adapted business model to interview results.

Teaching Assistant, August 2009 - December 2012
Math Department University of Iowa
• Math for Business Fall 2010, Fall 2011
• Math for Biology Spring 2010

- Calculus II Spring 2011
- Calculus I Fall 2012
- REU - Advised students in bone modeling projects. Summer 2011

Publications

- Xiayi Wang, Marc J. Brouillete, Bruce P. Ayati, and James A. Martin, *A Validated Model of the Pro- and Anti-inflammatory Cytokine Balancing Act in Articular Cartilage Lesion Formation*, Revised and Resubmitted, *Frontiers in Bioengineering and Biotechnology, Biomechanics*.
- Xiayi Wang, Bruce P. Ayati, Marc J. Brouillete, Jason M. Graham, Prem S. Ramakrishnan, and James A. Martin, *Modeling and Simulation of the Effects of Cyclic Loading on Articular Cartilage Lesion Formation*, *Intl. J. for Numerical Methods in Biomedical Engineering*, 30(10), 2014, pp. 927-941.
- Xiayi Wang, *New Central Configurations for Planar 12-body Problem*, *Journal of Leshan Teachers College*, 2009, 24(5).
- Xiayi Wang, *Periodic Solutions for Planar 2N-Body Problems*, Bachelor Thesis of Sichuan University, Selected and included in *Collection of Excellent Graduate Theses of Sichuan University of 2006*.

Working Papers

- Xiayi Wang, Bruce P. Ayati, Marc J. Brouillete, and James A. Martin, *Age Structured Model of Cyclic Loading on Articular Cartilage Lesion Formation*, Anticipated Completion 2015
- Xiayi Wang, Georgi I. Kapitanov, Bruce P. Ayati, Marc J. Brouillete, and James A. Martin, *Biphasic Model on Articular Cartilage*, Anticipated Completion 2015

Research Skills

Mathematics: Mathematical Biology \diamond Mathematical Modeling \diamond Numerical Analysis \diamond Differential Equations \diamond Optimization

Biostatistics: Linear Models \diamond Statistical Computing \diamond Categorical Data Analysis \diamond Survival Data Analysis \diamond Clinical Trails

Computer Skills

Programming: MATLAB, R, SAS, C/C++, Maple, Mathematica

Others: High Performance Computing (Cluster), Version Control (Git), UNIX/Linux shell, \LaTeX

Languages

Chinese (Native); English (Fluent)

References

- Prof. Bruce P. Ayati, Associate Professor,
Department of Mathematics, University of Iowa, IA 52242.
Tel: 319-335-0787, email: bruce-ayati@uiowa.edu
- Prof. James A. Martin, Associate Professor,
Department of Orthopaedics and Rehabilitation, University of Iowa, IA 52242.
Tel: 319-335-7550, email: james-martin@uiowa.edu
- Prof. Gideon K. D. Zamba, Associate Professor,
Department of Biostatistics, University of Iowa, IA 52242.
Tel: 319-384-1586, email: gideon-zamba@uiowa.edu