

# Gevorg Grigoryan

## EDUCATION

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Massachusetts Institute of Technology, Cambridge, Massachusetts

**PhD in Biology** (September 2002 – June 2007)

University of Maryland Baltimore County, Baltimore, Maryland

**Bachelor of Science in Computer Science** and **Bachelor of Science in Biochemistry**

**Summa Cum Laude** (May 2002)

■ Awards/Achievements:

- NRSA Individual Postdoctoral Fellowship, 2009 – present
- NRSA Institutional Postdoctoral Fellowship, 2008 – 2009
- Whitaker Health Sciences Fund Fellow for the 2006-07 academic year
- Chemical Biophysics Symposium 2006 travel award recipient
- Outstanding Achievement in Computer Science award at University of Maryland Baltimore County (May 5, 2002)
- Pfizer Scholarship recipient for the academic year of 2001-2002
- Lockheed Martin Scholarship recipient for Spring 2000
- Member of Golden Key National Honor Society

## PUBLICATIONS

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- G. Grigoryan, A. W. Reinke, and A. E. Keating, "Design of protein-interaction specificity gives selective bZIP-binding peptides", *Nature*, **458**, 859-864 (April 2009).
- J. R. Apgar, S. Hahn, G. Grigoryan, and A. E. Keating, "Cluster-Expansion Models for Flexible-Backbone Protein Energetics", *Journal of Computational Chemistry*, in press.
- G. Grigoryan and A. E. Keating, "Structural Specificity in Coiled-coil Interactions", *Current Opinion in Structural Biology*, **18**(4), 477-483 (August 2008).
- G. Grigoryan, W. F. DeGrado, "Modest membrane hydrogen bonds deliver rich results", *Nature Chemical Biology*, **4**, 393-394 (Jul 2008).
- G. Grigoryan, A. Ochoa and A. E. Keating, "Computing van der Waals Energies in the Context of the Rotamer Approximation", *PROTEINS: Structure, Function, and Bioinformatics*, **68**(4), 863-878 (September, 2007).
- G. Grigoryan, F. Zhou, S. R. Lustig, G. Ceder, D. Morgan and A. E. Keating, "Ultra-fast Evaluation of Protein Conformational Energies Directly from Sequence", *PLoS Computational Biology* **2**(6), e63 (June 2006).
- G. Grigoryan and A. E. Keating, "Structure-based prediction of bZIP partnering specificity", *Journal of Molecular Biology* **355**, 1125-1142 (3 February, 2006).
- F. Zhou, G. Grigoryan, S. R. Lustig, A. E. Keating, G. Ceder, and D. Morgan, "Coarse-Graining Protein Energetics in Sequence Variables", *Physical Review Letters* **95**, 148103 (September 30, 2005).
- M. H. Ali, C. M. Taylor, G. Grigoryan, K. N. Allen, B. Imperiali, and A. E. Keating, "Design of a Heterospecific, Tetrameric, 21-Residue Miniprotein with Mixed  $\alpha/\beta$

Structure", *Structure* **13**(2), 225 - 234 (2005).

- G. Grigoryan and P. Rheingans, "Point-based probabilistic surfaces to show surface uncertainty", *IEEE Transactions On Visualization And Computer Graphics*, **10**(5): 564-573 (2004).
- G. Grigoryan and P. Rheingans, "Probabilistic Surfaces: Point Based Primitives to Show Surface Uncertainty", *Proceedings of IEEE Visualization*, pages 147-153, (2002).
- G. Grigoryan, I.T. Lima, Jr., T. Yu, V.S. Grigoryan, and C.R. Menyuk, "Using Color to Understand Light Transmission", *Optics and Photonics News*, **11**(8), 44-50, (2000).

#### TALKS

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- "Computational Protein Design", Pfizer Global Research and Development, La Jolla Laboratories, La Jolla, CA, 2006
- "Modeling the bZip Interactome", MIT Biology Department Retreat, 2005
- "Probabilistic Surfaces", IEEE Visualization 2002, Boston, MA

#### POSTER PRESENTATIONS

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- "A General Method for Dealing with Specificity in Computational Protein Design", Protein Society Meeting, San Diego, CA, 2008
- "A Novel Framework for Specificity Design with an Arbitrary Number of Undesired States", Protein Society Meeting, Boston, MA, 2007
- "Ultra-fast Evaluation of Protein Energies Directly from Sequence: Speeding up Protein Design", Biophysical Society Meeting, Baltimore, MD, 2007
- "Ultra-fast Evaluation of Protein Energies Directly from Sequence: Speeding up Protein Design", Protein Society Meeting, San Diego, CA, 2006
- "Direct Mapping from Protein Sequence to Conformational Energy on a Fixed Backbone", Chemical Biophysics Symposium, Toronto, Canada, 2006
- "Energetics of bZIP partnering specificity", Protein Society Meeting, Boston, MA, 2005

#### TEACHING EXPERIENCE

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- Teaching Assistant, Foundations of Computational and Systems Biology, Massachusetts Institute of Technology, Cambridge, MD  
(Spring 2004 and Spring 2006 semesters)
  - Composed and graded problems sets and examinations for the class
  - Held recitation sections, helped students with the material
- Research Mentor, Massachusetts Institute of Technology, Cambridge, MD  
(Spring 2005 - Summer 2006)
  - Served as a research mentor for an undergraduate student in lab
  - A paper based on the research is currently in press

## PROFESSIONAL EXPERIENCE

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- Post-doctoral Fellow, laboratory of Dr. William Degrado, Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA  
(January 17, 2008 - present)
- Post-doctoral Fellow, laboratory of Dr. Amy E. Keating, Massachusetts Institute of Technology, Cambridge, MA.  
(May 2007 - January, 2008)
- Graduate Research Assistant, PhD program in Biology, laboratory of Dr. Amy E. Keating, Massachusetts Institute of Technology, Cambridge, MA.  
(June 2003 - May 2007)
- Undergraduate Research Assistant, Graphics Animation and Visualization Lab of Dr. Penny Rheingans, University of Maryland Baltimore County, Baltimore, MD  
(September 2001 - April 2003)
  - Developed a new technique for representing 3D surfaces with uncertainties.
  - Implemented an OpenGL program utilizing this technique to model and display growing tumor formations.
  - Based on the conducted research presented an article at the IEEE Visualization conference in October 2002.
- Undergraduate research assistant, Mass Spectroscopy Laboratory of Dr. Daniel Fabris, University of Maryland Baltimore County, Baltimore, MD  
(November 2000 - May 2002)
  - Developed and implemented an algorithm for efficient calculation of isotopic distributions in mass spectra.
  - Implemented a program that calculates expected fragmentation of peptides in a mass-spectroscopy experiment.
  - Provided a GUI using Visual Basic for all of the implemented programs.
- Summer Associate, Pfizer Global Research and Development, Groton, CT  
(Summer 2002)
  - Prepared a similarity-based program for predicting a wide range of chemical properties for novel compounds.
  - Improved the web interface of a pre-existing property calculator and incorporated the newly developed method into it.
  - Suggested a variety of new approaches for improving prediction accuracy.

(Summer 2001)

  - Used a neural network approach to develop a model for predicting compound binding to a cell surface receptor.
  - Automated the use of an alternative model for the same prediction earlier developed by Pfizer.
  - Equipped the latter model with a web interface (with 3D molecular viewing capabilities).

(Summer 2000)

  - Developed VBA tools under Microsoft Excel for handling genetic data.

- Communicated with biologists and provided solutions for their problems of managing genetic data using the VBA tools developed.
- Software Engineer, Corvis Corporation, Columbia, MD  
(contract: November 2000 – January 2001)
  - Rewrote a simulation program written in Fortran by scientists at Corvis to conform to Fortran 90 standards.
  - Incorporated this renewed code into Matlab 6.0 as a native function.
  - Established an interface between Photonics Transmission Design Suite 1.4 (by Virtual Photonics, Inc.) and the Fortran program as a “black-box” module.
- Undergraduate Research Assistant, University of Maryland Baltimore County, CSEE Department, Computational Photonics Group, Baltimore, MD  
(June 1998 – October 2000)
  - Conducted research in the area of optical fiber communications with heavy use of computer simulation and graphics, resulting in a peer-reviewed paper.
  - Designed, implemented and maintained a new web site for the group.
  - Handled a network of 20 computers of different platforms (IBM, Apple, and SGI) and provided computer support for group members.

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PROFESSIONALLY RELEVANT SKILLS

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- Computer skills:
  - Programming languages: C, C++, Matlab, Perl, Python, SQL, Java, Fortran, HTML, JavaScript, Visual Basic, Assembly.
  - Parallel computing: considerable experience with distributed cluster computing, MPI, mthreads.
  - Graphics programming: OpenGL, Matlab.
  - Operating Systems: Linux/UNIX/IRIX, Windows, MacOS.
- Language skills:
  - Fluent command of English, Russian, Armenian.