

Curriculum Vitae of Pak-Wing Fok

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EMPLOYMENT Assistant Professor (September 2009 - Present)
Department of Mathematical Sciences, University of Delaware

Postdoctoral Scholar (September 2006-August 2009)
Department of Biomathematics, UCLA

Von Kármán Instructor (October 2006-March 2009)
Applied and Computational Mathematics,
California Institute of Technology

Computation Directorate Scholar (Summer 2004 and 2005)
Lawrence Livermore National Laboratory

VISITING
POSITIONS Chinese University of Hong Kong
Department of Mathematics,
January 2010-February 2010

California Institute of Technology
Applied and Computational Mathematics,
March 2009-August 2009

EDUCATION Ph.D. Mathematics, Massachusetts Institute of Technology 2006
MSci. Mathematics, Imperial College London 2001

AWARDS University of Delaware Research Foundation (UDRF) Grant (\$35,000) “Stochastic models of unfolding proteins”, 06/01/2010 - 05/31/2012
Charles and Holly Housman Award for Excellence in Teaching (2006, MIT)
Akamai Presidential Graduate Fellowship (2002, MIT)
The Governor’s Prize for Best MSci. Student (2001, Imperial College)

RESEARCH
INTERESTS

Quantitative Biology: Atherosclerosis and plaque formation, stochastic inverse problems, DNA repair
Materials Science: Step and continuum models of crystal morphology.
Numerical Methods: Multirate integration schemes.

PUBLICATIONS

10. P.-W. Fok, "Drift Reconstruction from First Passage Time Data", *Submitted to Inverse Problems*
9. P.-W. Fok, "Growth of Necrotic Cores in Atherosclerotic Plaque", *Submitted to Mathematical Medicine and Biology*
8. P.-W. Fok and T. Chou, "Reconstruction of potential energy profiles from multiple rupture time distributions", *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* **466** 2124 pp 3479-3499 (2010)
7. P.-W. Fok and T. Chou, "Accelerated search kinetics mediated by redox reactions of DNA repair enzymes", *Biophysical Journal* **96** 3949-3958 (2009)
6. P.-W. Fok and T. Chou, "Interface growth driven by surface kinetics and convection", *SIAM Journal of Applied Mathematics* **70**(1) pp 24-39 (2009)
5. P.-W. Fok, C.-L. Guo and T. Chou, "Charge-transport mediated recruitment of DNA repair enzymes", *Journal of Chemical Physics* **129** 235101 (2008)
4. P.-W. Fok, D. Margetis and R. R. Rosales, "Facet evolution on supported nanostructures: Effect of finite height", *Physical Review B* **78** 235401 (2008)
3. S. Nowak, P.-W. Fok and T. Chou, "Dynamic boundaries in asymmetric exclusion processes", *Physical Review E* **76** 031135 (2007)
2. P.-W. Fok, D. Margetis and R.R. Rosales, "Unification of step bunching phenomena on vicinal surfaces", *Physical Review B* **76** 033408 (2007)
1. D. Margetis, P.-W. Fok, M.J. Aziz and H.A. Stone, "Continuum theory of nanostructure decay via a microscale condition", *Physical Review Letters* **97** 096102 (2006)

COURSES
TAUGHT

Math 616: Introduction to Applied Mathematics (University of Delaware, Fall 2010)
Math 302: Differential Equations (University of Delaware, Spring 2010)
Math 260: Integrative Seminar (University of Delaware, Spring 2011)
Math 241: Analytic Geometry and Calculus A (University of Delaware, Fall 2009, 2010, Spring 2011)
ACM101a, ACM101c: Methods of Applied Mathematics I (Caltech, Fall and Spring 2008)
ACM104: Linear Algebra (Caltech, Winter 2008)
ACM106b, ACM106c: Introduction to Computational Methods (Caltech, Winter and Spring 2007),

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18.075 Advanced Calculus for Engineers (MIT, Summer 2004, Primary Instructor) 18.03 Differential Equations (MIT, Spring 2005, Fall 2005, Spring 2006, Recitation Leader)

SERVICE

Invited reviewer for *Communications in Computational Physics*, *Journal of Computational Physics* and *Journal of Theoretical Biology*

Organizer, Applied Math Seminar, Dept. Math Sciences, University of Delaware (Fall 2010-present)

Third Reader for Board of Senior Thesis Readers, University of Delaware (2009-present)

Outreach Committee, Dept. Math Sciences, University of Delaware 2009–present

STUDENT SUPERVISION

PhD student Qunhui Han, Dept. Math Sciences, U. Delaware

Senior Thesis Advisor to Colleen Moens (U. Delaware)

Mentor to Nathan Giguere, Independent Study, Winter 2011, U. Delaware

Co-mentor to Dahye Song, Caltech SURF (Summer Undergraduate Research Fellowship) program, Summer 2008

INVITED TALKS AND PRESENTATIONS

39. American Physical Society, Dallas, TX, March 21st 2011, “*Growth of Necrotic Cores in Vulnerable Plaque*”

38. Biophysical Conference, Baltimore, MD, MD, March 7th 2011, *Reconstruction of bond potentials from rupturing time distributions* (poster)

37. University of Delaware, Delaware Biotechnology Institute, Newark, DE, October 14th 2010, *DNA Search and Repair: How do Glycosylases find damaged bases so quickly?*”

36. SIAM Conference on the Life Sciences, Pittsburgh, PA, July 12th - July 15th 2010, “*Accelerated DNA Repair by Charge Transport: Stochastic Analysis and Deterministic Models*”

35. Oxford University, UK, Oxford Centre for Collaborative Applied Mathematics (OCCAM) Modelling at Different Scales in Biology 21st - 23rd June 2010, “*Accelerated Target Selection by Repair Enzymes through Charge Transport* (poster)”

34. Education on the Edge 2010, University of Delaware, June 9th - June 11th 2010, “*DNA Search and Repair: How do Glycosylases find damaged bases so quickly?*”

33. American Physical Society, Portland, OR, March 17th 2010, “*Reconstruction of potential energy profiles from multiple rupture time distributions*”

32. Ohio State University, Mathematical Biosciences Institute, Workshop on Protein-DNA interactions, March 8th 2010, “*Accelerated Target Selection by Repair Enzymes through Charge Transport*” (poster)

31. University of Delaware, Department of Mathematical Sciences, February 16th 2010, "*Reconstruction of bond potentials from rupturing time distributions*"
30. Hong Kong University of Science and Technology, Department of Mathematics, Croucher Lab Seminar, January 19th 2010, "*Reconstruction of bond potentials from rupturing time distributions*"
29. Hong Kong University of Science and Technology, Bioengineering Program, January 6th 2010, "*Acceleration of DNA repair by charge-transport*"
28. Temple University, Department of Mathematics, November 9th 2009, "*Reconstruction of bond potentials through rupturing time distributions*"
27. George Mason University, Department of Mathematics, October 30th 2009, "*Reconstruction of bond potentials through rupturing time distributions*"
26. Gordon Research Conference on Thin Film and Crystal Growth Mechanisms July 12th – July 17th 2009, Colby-Sawyer College, NH, "*Mathematical aspects of epitaxial growth: asymptotics and conservation laws*" (poster)
25. Kinetic Description of Multiscale Phenomena: Young Researchers Workshop March 2nd – March 5th 2009, Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, "*Acceleration of DNA repair through Charge-Transport: stochastic analysis and deterministic models*"
24. Biophysical Conference, Boston, MA, February 28th – March 4th 2009, "*Accelerated target selection by Repair Enzymes through Charge Transport*" (poster)
23. University of Utah, Department of Mathematics, February 19th 2009, "*Mathematical aspects of epitaxial growth: asymptotics, conservation laws and multiscale modeling*"
22. University of Utah, Department of Mathematics, February 18th 2009, "*Acceleration of DNA repair through Charge-Transport: stochastic analysis and deterministic models*"
21. University of South Carolina, Department of Mathematics, February 16th 2009, "*Mathematical aspects of epitaxial growth: asymptotics, conservation laws and multiscale modeling*"
20. University of Delaware, Department of Mathematical Sciences, February 5th 2009, "*Acceleration of DNA repair through Charge-Transport: stochastic analysis and deterministic models*"
19. North Carolina State University, Department of Mathematics, February 3rd 2009, "*Acceleration of DNA repair through Charge-Transport: stochastic analysis and deterministic models*"
18. Northwestern University, Department of Engineering Science and Applied Mathematics, January 20th 2009, "*Acceleration of DNA repair through Charge-Transport: stochastic analysis and deterministic models*"

17. University of Alberta, Department of Mathematical and Statistical Sciences, January 12th 2009, “*Search of DNA repair enzymes through a Charge-Transport mechanism*”
16. Michigan State University, Department of Mathematics, December 1st 2008, “*Search of DNA repair enzymes through a Charge-Transport mechanism*”
15. Q-Bio Conference on Cellular Information Processing, Santa Fe, NM, August 6th – 9th 2008, “*Guanine Mediated Adsorption of DNA Repair Proteins*” (poster)
14. SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, 11th – 14th May 2008, “*Facet Evolution on Supported Nanostructures: effect of Finite Height*”
13. Association for Research in Vision and Ophthalmology, Fort Lauderdale, FL, May 2007, “*Nutrient Diffusion through Subretinal Implants*” (poster)
12. California Institute of Technology, Applied and Computational Mathematics Colloquium, 12th March 2007, “*Relaxation of crystal surfaces through step-flow models*”
11. American Physical Society, Denver, CO, 5th – 9th March 2007, “*Free boundaries in driven diffusive systems*”
10. Gordon Conference on Thin Films and Small Scale Mechanical Behavior, Colby College, ME, 30th July – 4th August 2006, “*Step Bunching on Axisymmetric Crystal Surfaces*” (poster)
9. 7th World Conference on Computational Mechanics, Los Angeles, CA, 16th – 22nd July 2006, “*Multi-adaptive Integration of Step-Flow Equations*”
8. École Polytechnique Fédérale de Lausanne, Switzerland, MIT-EPFL Joint Seminar, 29th May 2006, “*Fluid Dynamics of Soap Films*”
7. UC Santa Barbara, Department of Mechanical Engineering Seminar, 13th March 2006, “*Relaxation of crystal surfaces through step-flow models*”
6. California Institute of Technology, Applied and Computational Mathematics Colloquium, 10th March 2006, “*Relaxation of crystal surfaces through step-flow models*”
5. Lawrence Berkeley National Laboratory, Department of Mathematics Colloquium, 8th March 2006, “*Relaxation of crystal surfaces through step-flow Models*”
4. Materials Research Society, Boston, MA, 27th November – 1st December 2005, “*Step Bunching on Axisymmetric Crystal Surfaces*”, (poster)
3. American Physical Society, Chicago, IL, 20th – 22nd November 2005, “*Vorticity Dynamics in Soap Films*”, P. Fast and P.-W. Fok (Gallery of Fluid Motion)

2. ASME International Mechanical Engineering Congress and Exposition, Orlando, FL, November 2005, *“Evolution of Step Bunches on 2D Crystal Surfaces”*
1. UCLA, Institute for Pure and Applied Mathematics, 14th October 2005, *“Numerical simulations of stepped crystalline surfaces”*