

Duan Chen

Mathematical Biosciences Institute, The Ohio State University
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EDUCATION

- Ph.D., Applied Mathematics, Michigan State University, 2005-2010;
Advisor: Prof. Guowei Wei
- M.S & B.A., Applied Mathematics, Huazhong University of Sci. & Tech. 1998-2005.

RESEARCH EXPERIENCES

Research interests

- Mathematical modeling and simulation in molecular biology and industrial nano-transistors;
- Cancer research: modeling of tumor growth with cell-cytokines interactions pathways;
- Scientific computation: advanced algorithms for linear and nonlinear PDEs;
- Applications and numerical methods of stochastic PDEs;
- Analysis of free boundary problems.

University Experiences

- Post-doctoral fellow, Mathematic Biosciences Institute 2011-present
Mentor: Prof. Avner Friedman
- Post-doc, Dept. of Mathematics, Michigan State University 2010-2011
- Research/Teaching assistant, Dept. of Mathematics, MSU. 2005-2010

Research Honors/Awards

- **NSF Summer Institute Fellowship** on ASME 2010 First Global Congress on Nano-Engineering for Medicine and Biology, Houston, February 7-10, 2010
- **Paul and Wilma Dressel Endowed Scholarship**, Michigan State University, 2009;
- **Travel supports:**
 - Conference on Fluid Motion Driven by Immersed Structures, University of Toronto, August 9-13, 2010;
 - Frontiers in Mathematical Biology: NSF-NIH PIs Meeting 2010, University of Maryland, April 26-27, 2010;
 - Workshop on Mathematical and experimental approaches to dynamics of protein-DNA interactions, Mathematical Biosciences Institute, March 8-11, 2010.

PUBLICATIONS

Published/Accepted

- 13. **Duan Chen (corresponding author)** and Avner Friedman, “*A two-phase free boundary problem with discontinuous velocity: Application to tumor model*”, Journal of Mathematical Analysis and Applications, 2012, in press;
- 12. **Duan Chen (corresponding author)**, Tim D. Eubank, Avner Friedman, et al “*Hypoxia Induced Factors mediated-inhibition of cancer by GM-CSF: A mathematical model*”, Bulletin of Mathematical Biology, 2012, in press;
- 11. Langhua Hu, **Duan Chen**, and Guo-wei Wei, “*High-order fractional partial differential equation for molecular surface construction*”, Molecular Based Mathematical Biology, 2012, accepted;
- 10. **Duan Chen** and Guo-Wei Wei, “*Quantum dynamics in continuum models for proton transport III: Generalized correlation.*” Journal of Chemical Physics, 136, 134109, 2012;
- 9. **Duan Chen**, Zhan Chen and Guo-Wei Wei, “*Quantum dynamics in continuum models for proton transport II: Variational interface*”, International Journal for Numerical Methods in Biomedical Engineering, 28, 25-51, 2011;
- 8. **Duan Chen** and Guo-Wei Wei, “*Quantum dynamics in continuum for proton transport: I: Basic formulation*”, Communication in Computational Physics, 13, 285-324, 2013;
- 7. Qiong Zheng, **Duan Chen** and Guo-Wei Wei, “*Second-order Poisson-Nernst-Planck solver for ion channel transport*”, Journal of Computational Physics, 230, 5239-5262, 2011;
- 6. **Duan Chen** and Guo-Wei Wei, “*Modeling and simulation of electronic structure, material interface and random doping in nano-electronic devices*”, Journal of Computational Physics, 229, Vol. 229, 4431-4460, 2010;
- 5. **Duan Chen**, Zhan Chen, Changjun Chen, Weihua Geng and Guo-Wei Wei, “*MIBPB: A software package for electrostatic analysis*”, Journal of Computational Chemistry, 32, 756-770, 2011;
- 4. **Duan Chen**, G.W. Wei, X. Cong and Ge Wang, “*Computational methods for optical molecular imaging*”, Commun. Numer. Methods Engng, 25, 1137-1161, 2008;

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- 3. **Duan Chen**, Chang-Fa Xu and Yang-Guang Sun, “*Delta-sequence approach to solve PDE based on Daubechies wavelets*”, J. Huazhong Univ. Sci. Technol. Nat. Sci., Vol. 32, No. 10, 114-116, 2004;
- 2. Chang-Fa Xu, Kai Zhang, **Duan Chen** and Zhi-Fang Min, “*Delta-sequence approach to a two point boundary value problem using Daubechies wavelets*” J. Huazhong Univ. Sci. Technol. Nat. Sci. Vol. 32, No. 5 40-42, 2006;
- 1. Yang-Guang Sun, Chang-Fa Xu and **Duan Chen** “*Meshless method based on natural boundary element*”, J. Huazhong Univ. Sci. Technol. Nat. Sci. Vol. 32, No. 12 105-107, 2004.

Under review

- 1. Langhua Hu, **Duan Chen** and Guo-Wei Wei, “*Geometry and phonon effects on nano-transistors and sensors*”. Physical Review E, 2012;

In preparation

- **Duan Chen** and Avner Friedman, “*Analysis of a free boundary problem for a multiscale variational model of ion channels*, 2012 ;
- **Duan Chen**, Tim Eubank and Avner Friedman, “*Mathematical model of tumor growth with oxygen density, pH value, redox status, and Glutathione*”, 2012.

TALKS AND PRESENTATIONS

Invited talks

- 10. International Conference on Mathematical Modeling and Computation, Wuhan, China, May 16-19, 2013;
- 9. Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization, Mathematical Biosciences Institute, February 18-22, 2013;
- 8. SIAM Conference on the Life Sciences, San Diego, California, August 7-10, 2012;
- 7. SMB Annual Meeting and Conference, Knoxville, Tennessee, July 25-28, 2012;
- 6. The 9th AIMS Conference on Dynamical System, Partial Differential Equations and Applications, Orlando, Florida, July 1-5, 2012;
- 5. Department of Molecular Biophysics and Physiology, Rush University Medical Center, Chicago, Illinois, May 7-8, 2012;

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- 4. AMS Spring Central Section Meeting, University of Kansas, Lawrence, KS, March 30-April 1, 2012;
- 3. Modeling and Computation of Biomolecular Structure and Dynamics, Mathematical Biosciences Institute, The Ohio State University, April 25-29, 2011;
- 2. Department of Mathematics, North Carolina State University, February 10-11, 2011;
- 1. Computational and Mathematical methods in Sciences and Engineering, University of Wisconsin-Madison, May 24-26, 2010;

Contributed talks/posters

- 5. MBI postdoctoral seminar, Mathematical Biosciences Institute, Columbus, 2012, 2013;
- 4. Workshop on Nano-Bio Mathematics and Mechanics, East Lansing, August 5, 2010;
- 3. Fluid Motion Driven by Immersed Structures, University of Toronto, August 9-13, 2010;
- 2. Frontiers in Mathematic Biology: NSF-NIH PIs Meeting, University of Maryland, April 26-27, 2010;
- 1. Workshop on Nano-Bio Mathematics, East Lansing, August 4, 2009.

TEACHING EXPERIENCES

- **Project mentor**, MBI, OSU 2011-2012
 - Designed and mentored course projects for 20 undergraduate students in their course “Calculus and analytical geometry I for Life Sciences”
- **Instructor**, Department of Mathematics, MSU 2010-2011
 - **Independently** taught undergraduate courses “Calculus I” for two classes, over 35 students each class;
 - Individually helped and tutored students with serious disabilities
- **Student instructor**, Department of Mathematics, MSU 2008-2010
 - **Independently** taught undergraduate courses “Calculus I”, “Survey of Calculus” and “Finite Mathematics and Elements of College Algebra”
 - Tutored students in help room 2 hours per week
- **Teaching assistant**, Department of Mathematics, MSU, 2005-2007

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- Taught recitation of “Multivariable Calculus”
- Tutored students in help room 2 hours per week

PROFESSIONAL SERVICES

- Journal Article Reviewer:
 - ASME Journal of Biomechanical Engineering,
 - SIAM Journal of Applied Mathematics;
 - Journal of Computational Physics;
 - Brief Report in NANO;
- Organizer of MBI postdoctoral seminar, 2012-2013;
- Conference organization assistant: Midwest Conference on Mathematical Methods for Images and Surfaces, April 18-19, East Lansing, 2009.

PROFESSIONAL MEMBERSHIP

- American Mathematical Society (2005-);
- Society for Industrial and Applied Mathematics (2010-);
- Society of Mathematical Biology (2010-).

COMPUTER SKILLS

- Programming languages: Matlab, Fortran, C/C++, Perl;
- Scientific Computing packages: PETSc, SLATEC;
- Molecular Biology packages: CHARMM, APBS, VMD.

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REFERENCES

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(On teaching)

Keith Promislow, Professor

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