CURRICULUM VITAE

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Education

1994-1999	Ph.D. Applied Mathematics Courant Institute of Mathematical Sciences in New York University Advisor: Charles S. Peskin Dissertation: 2-D Simulations of Valveless Pumping using the Immersed Boundary Method
1989-1991	M.S. Mathematics Korea University in Korea
1984-1988	B.A. Education of Mathematics Korea University in Korea

Current Position

7/2001-	**Research Staff Member** Computational Mathematics Group in the Computer Science and Mathematics Division at Oak Ridge National Laboratory

Professional Experience

9/1999- 6/2001	Postdoctoral Research Associate Scientist Computational Mathematics Group in the Computer Science and Mathematics Division at Oak Ridge National Laboratory

Computer Skills

- Languages and Software: Fortran, C, Matlab
- Operation Systems: Windows 95/98/00, Unix, Linux

Research Interests

- **Numerical Analysis**
  - Moving boundary problems
    - Immersed Boundary Method
    - Boundary Element Method
  - Numerical linear algebra
  - Numerical algorithm for the differential equations (ODE and PDE)

- **Computational Fluid Dynamics**
  - Biofluid models in 2-D or 3-D, such as valveless pump or heart models, using the immersed boundary method
  - Climate modeling: A baroclinic model using the adaptive mesh refinement (AMR)
  - Lumped parameter circuit models: Cardiopulmonary Resuscitation (CPR) or Valveless Pumping (VP)

- **Mathematical Modeling in Biomedical and Engineering Applications**
  - Valveless Pump: Human embryo or CPR in the thoracic pump model
  - Simulations of blood flow during CPR: A mathematical model that is coupled with the PDEs for heart and ODEs (a lumped parameter circuit model) for the other circulation
  - Motion of Pteropod (small gastropod mollusks)
  - MicroElectroMechanical System (MEMS)

- **Optimal Control (OC) Techniques**
  - CPR using the OC: Maximizing the blood flow during CPR using the time dependent controls, such as frequency or duration.
  - Tuberculosis (TB) using OC: Finding the optimal strategy of the two-strain TB model.
  - Laser using OC: Reducing the transient time in coupled solid state lasers.

- **Scientific Computing**

Teaching Experience

Instructor: Courant Institute in New York University

1999 Spring	Linear Algebra
1998 Fall	Mathematical Thinking

Teaching Assistant: Courant Institute in New York University

1998 Spring	Calculus
1997 Fall	Calculus

Teaching Assistant: Korea University in Korea

1990 Fall	Functional Analysis
1990 Spring	Calculus
1989 Fall	Linear Algebra
1989 Spring	Calculus

Presentations/Seminars/Conferences

7/15/02	**Local committee**: 2002 Annual Meeting and International Conference on Mathematics and Biology at University of Tennessee **(**http://www.tiem.utk.edu/smb02/)
7/9/02	Contributed talk: SIAM Annual Meeting at Philadelphia (http://www.siam.org/confpart/sess/dsp_programsess.cfm?SESSIONCODE=1557)
4/18/02	Attend: Resuscitation and Bioengineering Science organized by the University of Chicago and Argonne National Laboratory (ANL) at ANL
3/4/02	Special Lecture: University of Minnesota (http://www.math.umn.edu/~seminar/2002_March_4.html)
7/01	Contributed talk: SIAM Annual Meeting at San Diego (http://www.siam.org/confpart/sess/dsp_programsess.cfm?SESSIONCODE=875)
6/14/01	Invited talk: Workshops on Issues in Cardiovascular-Respiratory Control Modeling at Graz, Austria (http://bedvgm.kfunigraz.ac.at:8001/jerry/conference.html)
6/7/01	Invited talk: Seminar in the department of Applied Mathematics at KAIST, Korea
5/31/01	Invited talk: Colloquium talk in the department of Mathematics at Yonsei University, Korea
11/13/00	Invited talk: Seminar in the department of Mathematics at Tulane University
11/12/00	Attend: American Heart Association Scientific Sessions 2000 at New Orleans
11/00	Poster: SC2000, High performance networking and computing conference at Dallas (http://www.csm.ornl.gov/SC2K/compmath.html)
7/10/00	Contributed talk: SIAM Annual Meeting at Puerto Rico (http://www.siam.org/meetings/an00/cp15.htm)
7/12/00	Invited talk: Association for Women in Mathematics at SIAM Meeting in Puerto Rico, Minisymposium on Biological and Physical Modeling Applications (http://www.awm-math.org/calendar/siam2000.html)
6/26/00	Invited talk: Applied Mathematics Forum at Korea (http://www.amf.or.kr/amf6/speaker.html)
6/23/00	Invited talk: Seminar in Applied Mathematics at Korea University, Korea
4/26/00	Invited talk: Seminar in PDE at University of Tennessee
4/3/00	Invited talk: International Conference on Mechanics in Medicine and Biology (http://www.ornl.gov/~webworks/cpr/pres/105984.pdf)
3/22/00	Invited talk: Seminar in Biomathematics at Courant Institute in NYU

11/8/00 Attend: American Heart Association Scientific Sessions 1999 at Atlanta

8/22/99 Invited talk: Applied Mathematics Seminar at Iwha Women University, Korea

7/9/99 Invited talk: Virtual Human Meeting at Oak Ridge National Laboratory

5/99 Invited poster session: Association for Women in Mathematics at SIAM meeting in Atlanta (http://www.siam.org/meetings/an99/awm.htm)

1/15/99 Invited talk: Seminar at Harvard University

Professional Activities

Member

- Association for Women in Mathematics (AWM): http://www.awm-math.org
- Society for Industrial and Applied Mathematics (SIAM): http://www.siam.org
- Society for Mathematical Biology (SMB): http://www.smb.org

7/13/02 Local organizing committee of 2002 Annual Meeting of the Society for Mathematical Biology (SMB)
Organizer of the minisymposium on the topic of Computational Biofluid Dynamics (http://www.tiem.utk.edu/smb02/)

4/02 *Modeling Blood Flow During CPR*, ORNL Review Vol. 35, No. 1, 2002 (http://www.ornl.gov/ORNLReview/)

2/2/02 **An article of valveless pumping, Squeeze Tease, New Scientist Journal Magazine**, pp. 38-39, February 2002. (http://www.newswise.com/articles/2002/1/FEB02.NSC.html)

7/01 ORNL Reporter, Number 28, pp. 7 (http://www.ornl.gov/reporter/no28/july01.pdf)

Fellowships/Honors

5/7/02 **Seed Money Fund Project** funded by the Oak Ridge National Laboratory, *Cardiopulmonary Resuscitation (CPR) Using Optimal Control* (http://www.csm.ornl.gov/~jung/SeedMoneyCPR.doc)

7/00 Travel Award, Association for Women in Mathematics at SIAM meeting in Puerto Rico, Minisymposium on Biological and Physical Modeling Applications

9/99-6/01 Postdoctoral Research Fellowship, Oak Ridge National Laboratory

5/99 Travel Award, Association for Women in Mathematics at SIAM meeting in Atlanta

1997-98 Teaching Assistantship, Courant Institute

1997-98 Summer Research Fund, Courant Institute

1989-91 Teaching Assistantship, Korea University

Publications

1. 2-D Simulations of Valveless Pumping using the Immersed Boundary Method, Ph.D. Thesis, Courant Institute of Mathematical Sciences in New York University, 9, 1999 (http://www.csm.ornl.gov/~jung/PhD_thesis.ps)

2. Simulations of Valveless Pumping using the Immersed Boundary Method, Proceedings of ICMMB-11: International Conference on Mechanics in Medicine and Biology, April 2-5, 2000, pp. 41-44 (with C. S. Peskin) (http://www.ornl.gov/~webworks/cpr/pres/105984.pdf)

3. 2-D Simulations of Valveless Pumping using the Immersed Boundary Method, SIAM Journal of Scientific Computing, 23, 1, pp.19-45, 2001 (with C.S. Peskin) (http://epubs.siam.org/sam-bin/dbq/toc/SISC/23/1)

4. Optimal Control of Treatments in a Two-Strain Tuberculosis Model, accepted to Discrete and Continuous Dynamical Systems (with S. Lenhart and Z. Feng) (http://www.csm.ornl.gov/~jung/oc_tb0905.pdf)

5. Optimal Control of Transient Behavior in Coupled Solid State Lasers, submitted to Physical Review Letters (with S. Lenhart, V. Protopopescu, and Y. Braim) (http://www.csm.ornl.gov/~jung/laser0816.pdf)

6. 2-D Simulations of Valveless Pumping using the Immersed Boundary Method II, will be submitted to SIAM Journal of Scientific Computing (with C.S. Peskin) (http://www.csm.ornl.gov/~jung/vpII1018.pdf)

7. Valveless Pumping: the Reflected Pulse Wave Hypothesis, will be submitted to the American Journal of Physics (with C. F. Babbs) (http://www.csm.ornl.gov/~jung/Pulsewave_VP.doc)

8. 3-D Simulations of Valveless Pumping using the Immersed Boundary Method, in progress

9. Study on the Emergence of Winged Flight by the Development of the Pteropod using the Immersed Boundary Method, in progress (with S. Childress)

10. A Lumped Parameter Circuit Model of Valveless Pumping, in progress (with C. F. Babbs)

11. Cardiopulmonary Resuscitation Using Optimal Control, in progress (with S. Lenhart, V. Protopopescu)

A List of References

1. **Charles S. Peskin**

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2. **Brian A. Worley**

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3. **Suzanne Lenhart**

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University of Tennessee and Oak Ridge National Laboratory
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4. **Charles F. Babbs , MD, PhD**

Associate Research Scholar
Basic Medical Sciences
Purdue University
Voice: (765) 496-2661
E-mail: babbs@purdue.edu

5. **Zhilan Feng**

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Purdue University
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6. **Melvin Hausner (teaching)**

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