

# Mark S. Herman

## University Address:

Institute for Mathematics and its Applications (IMA)  
University of Minnesota  
114 Lind Hall, 207 Church St. SE  
Minneapolis, MN 55455  
Office: (612) 626-0788

## Home Address:

2058 Bordner Place  
Saint Paul, MN 55116  
Home: (651) 493-6848  
E-mail: mherman@ima.umn.edu  
Homepage: [www.ima.umn.edu/~mherman/](http://www.ima.umn.edu/~mherman/)

## Employment

September 2008 – Present  
Postdoctoral Fellow, Institute for Mathematics and its Applications (IMA), University of Minnesota

## Education

Ph.D., Mathematics, Virginia Polytechnic Institute and State University (Virginia Tech), August 2008  
Thesis Advisor: George Hagedorn  
Title: Born-Oppenheimer corrections near a Renner-Teller crossing.

M.S., Mathematics, Virginia Tech, December 2004

B.S., Mathematics and Physics, State University of New York (SUNY) at Fredonia, May 2003

## Research Interests

Mathematical physics, more specifically, applications of functional analysis and perturbation theory to quantum mechanics and many-body molecular systems.

## Honors and Awards

- Outstanding Graduate Teaching Assistant Award 2008 (Virginia Tech mathematics department)
- Steeneck Graduate Fellowship 2006, 2007 (Virginia Tech mathematics department)
- SIAM Award 2003 (SUNY Fredonia mathematics department)
- Hack Arroe Award 2003 (SUNY Fredonia physics department)
- Sigma Pi Sigma 2003 (physics)
- Pi Mu Epsilon 2003 (mathematics)
- Magna Cum Laude (SUNY Fredonia)

## Publications

- Herman, M. S., A Born-Oppenheimer expansion in a neighborhood of a Renner-Teller intersection, *submitted*.
- Herman, M. S., Born-Oppenheimer corrections near a Renner-Teller crossing. Ph. D. Thesis, Virginia Tech (2008).
- Herman, M. S. and Hagedorn, G. A., Does Møller-Plesset theory converge? A look at two-electron systems. *International Journal of Quantum Chemistry*, *to appear*. Available online- DOI: 10.1002/qua.21763

## Presentations/Posters

- October 2008: Born-Oppenheimer corrections near a Renner-Teller crossing, *IMA Postdoc Seminar*, Minneapolis, MN.
- September 2008: Born-Oppenheimer corrections near a Renner-Teller crossing, contributed poster, *IMA Workshop on Mathematical and Algorithmic Challenges in Electronic Structure Theory*, Minneapolis, MN.
- July 2008: Born-Oppenheimer corrections near a Renner-Teller crossing, *Virginia Polytechnic Institute and State University Dissertation Defense*, Blacksburg, VA.
- May 2007: Does Møller-Plesset theory converge? A look at two-electron systems, contributed speaker, *Southeastern Theoretical Chemistry Association (SETCA) Annual Meeting*, Blacksburg, VA.

## Teaching Experience

August 2003 – May 2008

Graduate Teaching Assistant, Department of Mathematics, Virginia Tech

Courses taught at Virginia Tech with full responsibility (lecturing, grading, creating lesson plans, quizzes, and tests)

- *MATH 1206: Integral Calculus* (spring 2008, fall 2007, fall 2006, spring 2006)  
For mathematics, engineering, and physical science majors.
- *MATH 2016: Elementary Calc. with Trig. II* (spring 2007)  
Primarily for life science majors; topics included multivariable calculus, differential equations, and integration techniques.

Other Teaching Experience at Virginia Tech

- In fall 2007 and spring 2008, served as a faculty mentor for first year graduate students as part of their completion of the teaching certification process in the Virginia Tech Department of Mathematics.
- *MATH 1016: Elementary Calc. with Trig. I- Online Course Administrator* (summer 2006)  
Primarily for life science majors; topics included pre-calculus and differential calculus.  
Responsibilities: Setting the schedule of due dates for quiz and test deadlines, updating web pages daily with announcements and reminders, sitting office hours for additional help, and assigning final grades.
- *MATH 1224: Vector Geometry- Recitation Instructor* (fall 2005, spring 2005, fall 2004)  
For mathematics, engineering, and physical science majors.  
Responsibilities: Running recitation sessions, creating quizzes, and sitting office hours for freshman level class. Emphasis on teaching with cooperative learning and guidance through lessons and problems, with limited lecturing.
- *Math Emporium Assistant* (spring 2004, fall 2003)  
Responsibilities: Provided on-the-spot help for students taking online mathematics classes at the Math Emporium; an enormous computer lab that primarily serves as a place of study and testing for online math classes.

## Education Training

- Completed the Virginia Tech math department certification process in fall 2003.  
Responsibilities: Observed a faculty mentor lecturing for several weeks, then presented two lectures and was given feedback and evaluation by the mentor.
- Education Courses and Field Experiences Completed at SUNY Fredonia
  - *EDU 250: Introduction to the Exceptional Learner* (2000)  
Included a field experience involving tutoring of a special-needs student at a local high school throughout the semester.
  - *EDU 224: Adolescent Development* (2000)
  - *EDU 101: First Field Experience* (1999)  
Observed a high school class for a week during winter break.

## Related Experience

Computer Skills- experience with

- Matlab
- Mathematica
- Latex
- Microsoft Excel

Undergraduate Research

- 2003: Charged particle in a cylindrical magnetic field: eigenfunctions and eigenvalues, contributed poster, *Student Research and Creative Endeavors Exposition*, SUNY Fredonia.
- 2002: Participated in the REU program in mathematics at Carnegie Mellon University. Research was related to calculus of variations.

## References

- *George Hagedorn*, Mathematics, Virginia Tech, Ph.D. Advisor  
hagedorn@math.vt.edu, (540) 231-6575
- *Eileen Shugart*, Mathematics, Virginia Tech, teaching reference  
shugart@math.vt.edu, (540) 231-8044
- *Martin Klaus*, Mathematics, Virginia Tech  
klaus@math.vt.edu, (540) 231-6533
- *T. Daniel Crawford*, Chemistry, Virginia Tech  
crawdad@vt.edu, (540) 231-7760
- *Sharon Hughes*, Accelerated College Program, San Diego Mesa College, teaching reference  
shughes@sdccd.edu