

# Mark Christopher Lewis

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## Education

1996 - 2001

University of Colorado at Boulder  
Ph.D. from the Department of Astrophysics and Planetary Science, May 2001  
Masters degree in Computer Science, December 2000  
Masters degree awarded by APS, December 1998

1992 - 1996

Trinity University  
San Antonio, TX  
B.S. Physics with Honors  
B.S. Computer Science with Honors  
Minor in Mathematics

## Experience

Fall 2001 – Assistant Professor of Computer Science

Trinity University  
San Antonio, TX

For this position I teach a variety of classes in the computer science department. I largely focus on intro-sequence courses, but I occasionally teach more advanced courses as well. My standard teaching load is 9 contact hours and each semester I have a total of 50-60 students in my classes.

Fall 1996 – Summer 2001: Research Assistantship

University of Colorado at Boulder  
Laboratory for Atmospheric and Space Physics  
Boulder, CO

Developing and implementing code to do local simulations of planetary rings to determine the effects of collisions on gravitationally induced wakes.

Fall 2000: Instructor for Intermediate Astronomy

University of Colorado at Boulder  
Department of Astrophysics and Planetary Science  
Boulder, CO

Teaching an intermediate astronomy course on the topic of extrasolar planets to roughly 30 students.

Spring 2000: Southwest Research Institute Quick Look Grant

Southwest Research Institute Boulder Branch  
Boulder, CO

Worked with Dr. Harold Levison to develop a symplectic tree code to optimize the performance of large scale planetary formation integrations.

Summer 1999: Instructor for General Astronomy

University of Colorado at Boulder  
Department of Astrophysics and Planetary Science  
Boulder, CO

Teaching the General Astronomy - Solar System course in the summer A-term to 51 students.

Summer 1996: Weather Channel Project

Southwest Research Institute

San Antonio, TX

Worked on a team to write the software that handles the visual data processing and display for the Weather Channel. Personal responsibilities included the display code using C++ Performer 2.0 libraries on an Onyx IR System and input processing from I/O board.

Fall 1994 – Summer 1995: Research under AAS Grant

Physics Department

Trinity University

San Antonio, TX

Worked with Dr. Harold Levison of Southwest Research on celestial mechanics problem of correlating chaos to orbital stability.

Summer 1995: Virtual Reality Research under NSF REU Grant

Computer Science Department

Trinity University

San Antonio, TX

Worked with 9 other students to develop an algorithmic virtual time machine. Specifically worked as team leader on dynamic loading of large-scale fractal landscapes.

**Grants Funded**

“Dynamical Models of Planetary Rings” – NASA’s Planetary Geology and Geophysics group (PI – Dr. Glen Stewart, CU Boulder; CoI – Dr. Mark Lewis, Trinity University)

“N-Body Simulations of Density Waves in Planetary Rings” – NASA’s Planetary Geology and Geophysics group (PI – Dr. Glen Stewart, CU Boulder; CoI – Dr. Mark Lewis, Trinity University)

“Dynamical Models of Solar System Formation and Evolution” – NASA’s Planetary Geology and Geophysics group (PI – Dr. Glen Stewart, CU Boulder; CoIs – Dr. Mark Lewis, Trinity University and Dr. Keiji Ohtsuki, CU Boulder)

“Improving Swift” – NASA’s Applied Information Systems Research Program (PI – Dr. Harold Levison, SwRI Boulder; CoIs – Dr. Mark Lewis, Trinity University, Dr. Martin Duncan, Queens University at Kingston, Dr. Peter Tamblyn, SwRI Boulder, and Dr. John Chambers, NASA/Ames Research Center)

**Publications**

Peer Refereed Papers:

M. C. Lewis and B. Massingill, “Graphical Game Development in CS2: A Flexible Infrastructure for a Semester Long Project”, 2006, SIGCSE 2006.

M. C. Lewis, “Expectations for Cassini Observations of Ring Material with nearby Moons”, 2005, Icarus, 178, 124-143.

M. C. Lewis, “Efficient Collision Detection Optimized for Long Timesteps”, Proceedings of the IASTED International Conference on Modeling and Simulation, Cancun, Mexico, 2005.

M. C. Lewis and G. R. Stewart, “Enhancements to a Methodology for Simulations of Perturbed Planetary Rings”, Accepted to the Proceedings of the IASTED International Conference on Modeling and Simulation, Marina Del Rey, CA, USA, 2004, 184-190.

M. C. Lewis and N. Wing, “Analysis of a Distributed Methodology for Hard Sphere Collisional Simulations”, Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, NV, USA, 2003, 1208-1214.

M. C. Lewis and G. R. Stewart, "A Methodology for Granular Flow Simulations of Planetary Rings – Collision Handling", Proceedings of the IASTED International Conference on Modeling and Simulation, Palm Springs, CA, USA, 2003, 292-297.

M. C. Lewis and N. Wing, "A Distributed Methodology for Hard Sphere Collisional Simulations", Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, NV, USA, 2002, 404-409.

M. C. Lewis and G. R. Stewart, "A Methodology for Granular Flow Simulations of Planetary Rings – Coordinates and Boundary Conditions", Proceedings of the IASTED International Conference on Modeling and Simulation, Marina del Rey, CA, USA, 2002, 292-297.

M. C. Lewis and G. R. Stewart, "Collisional Dynamics of Perturbed Planetary Rings - Part II", Accepted pending modification by Icarus.

M. C. Lewis and G. R. Stewart, "Collisional Dynamics of Perturbed Planetary Rings - Part I", Astron. J. 120, 3295-3310.

M. C. Lewis and G. Pitts, "Applying Dynamic Loading to Hierarchical Meshes for Real-Time Viewing of Large Virtual Landscapes", 1996 SCS Simulation MultiConference.

M. C. Lewis, "Comparison of Lyapunov Time and Crossing Times for Prediction of Orbital Instabilities", Proceedings of the National Conference on Undergraduate Research 1995, pp. 804.

#### Conference Presentations:

"Impact of Self-Gravity at the Encke Gap Edge", 2004 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Collisional Formation of Arcs in Narrow Rings", 2003 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"High Resolution F ring Simulations with an Eccentric Prometheus", 2002 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Effects of Perturbation Magnitude on the Formation of Narrow Rings", 2002 Annual Meeting of the American Astronomical Society Division for Dynamical Astronomy.

"Narrow Rings Outside of Resonance", 2001 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Effects of Self-Gravity on Wakes at the Encke Gap", 2000 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Effects of Particle Size in Ring Wakes", 2000 Annual Meeting of the American Astronomical Society Division on Dynamical Astronomy.

"Analysis of Ring Wake Simulations", 1999 Annual Meeting of the American Astronomical Society Division on Dynamical Astronomy.

"Collisional Simulations of Wakes at the Encke Gap", 1998 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Automated Polygon Count Reduction of Object Models for Real-Time Graphic Rendering", 1996 National Conference on Undergraduate Research.

"Analysis of Algorithmic Real-Time Virtual Environments", 1995 PEW Midstates Science and Mathematics Consortium, Coauthor: Tyler Thompson.

Theses:

"Dynamics of Strongly Perturbed Planetary Rings", Doctorate Thesis, University of Colorado at Boulder, 2001.

"Chaos and Instability in the Solar System", Honors Physics Thesis, Trinity University, 1996.

"Large Scale Virtual Worlds", Honors Computer Science Thesis, Trinity University, 1996.