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. Honors in Physics
    B.S. Honors in Computer Science
    Minor in Mathematics

Experience
Fall 2001 – Present: 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

"An ACS-wide Conversation about Massive Open Online Courses and the Liberal Arts College" - 2012 ACS (PIs – Dr. Mark Lewis and Claudia Scholz)

"RUI: Numerical Simulation of Collisional Dynamics in Planetary Systems" - 2008 NSF AAG-RUI (PI – Dr. Mark Lewis, Trinity University; CoI – Dr. Berna Massingill, Trinity University)

"Experimental and Numerical Studies of the Early Stages of Planetary Formation" - 2008 NASA Origins (PI – Dr. Josh Colwell, University of Central Florida; CoI – Dr. Mark Lewis, Trinity University)

"Dynamical Models of Planetary Rings" – 2008 NASA's Planetary Geology and Geophysics group (PI – Dr. Glen Stewart, CU Boulder; CoI – Dr. Mark Lewis, Trinity University)

"RUI: Numerical Simulation of Planetary Rings with Nearby Moons" - 2005 NSF AAG-RUI (PI – Dr. Mark Lewis, Trinity University; CoI – Dr. Berna Massingill, Trinity University)

"Planetary Major Equipment Proposal for Dynamical Models of Planetary Rings" - 2005 NASA Major Equipment Grant (PI – Dr. Mark Lewis, Trinity University; CoI – Dr. Glen Stewart, CU Boulder)

"N-Body Simulations of Density Waves in Planetary Rings" – 2005 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" – 2001 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" – 2001 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
Books:
        Mark C. Lewis, "Introduction to the Art of Programming Using Scala", 2012, Chapman & Hall/CRC, 936 pages

Peer Refereed Papers and Abstracts:

Zachery Langbert and Mark C. Lewis, "Processing Hard Sphere Collisions on a GPU Using OpenCL", The 2014 International Conference on Parallel and Distributed Processing Techniques and Applications, Volume I, 35-41.

Lisa L. Lacher and Mark C. Lewis, "The Value of Video Quizzes in a Computer Science Flipped Classroom: An Empirical Study", The 2014 International Conference on Frontiers in Education: Computer Science and Computer Engineering, 94-100.

Mark C. Lewis, "Introduction to Scala and its use in CS education", 2014, Journal of Computing Sciences in Colleges, 29, 3, 72-72.

K. Baillié, J. E. Colwell, L. W. Esposito, and M. C. Lewis, "Meter-sized Moonlet Population in Saturn's C Ring and Cassini Division", 2013, The Astronomical Journal 145 (6), 171.

M. C. Lewis, K. Läufer, G. K. Thiruvathukal, "Using Scala strategically across the undergraduate curriculum", 2013, Proceeding of the 44th ACM technical symposium on Computer science education, 763.

B. Anthony, L. Bender, C. Chung, M. Lewis, "Trends in CS enrollment at small, liberal arts institutions", 2013, Proceeding of the 44th ACM technical symposium on Computer science education, 751.

K. A. Seitz and M. C. Lewis, "Virtual Machine and Bytecode Optimization on Heterogeneous Systems", 2012, Proceedings of the Ninth International Conference on Information Technology: New Generations (ITNG), 528-533

M. C. Lewis and C. Swords, "Lock-Graph: A Tree-Based Locking Method for Parallel Collision Handling with Diverse Particle Populations", 2011, Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications PDPTA'11, Volume I, 157-161.

A. B. Todd, A. K. Keller, M. C. Lewis, and M. G. Kelly, "Multi-agent System Simulation in Scala: An Evaluation of Actors for Parallel Simulation", 2011, Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications PDPTA'11, Volume I, 162-168

M. C. Lewis and G. R. Stewart, "Negative Diffusion in Planetary Rings with a Nearby Moon", 2011, Icarus, 213, 201-217.

S. Robbins, G. Stewart, M. Lewis, and J Colwell, "Estimating the Masses of Saturn's A and B Rings from High-Optical Depth N-Body Simulations and Stellar Occultations", 2010, Icarus, 206, 431-445.

Aaron Welch, Alejandro Lopez-Lago, Mark Lewis, Philip Jensen, and Ye Liu, "A Comparison of Load Balancing Algorithms for Spatially Oriented Multi-Agent Simulation Frameworks", 2010, Proceedings of PDPTA, 123-129.

M. C. Lewis, "Collision Finding for Particles on Non-linear Paths", Proceedings of the 2009 International Conference on Scientific Computing, Las Vegas, NV, USA, 118-124.

M. C. Lewis, M. Maly, B. L. Massingill, "Hybrid Parallelization of N-Body Simulations Involving Collisions and Self-Gravity", Proceedings of the 2009 International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, NV, USA, 324-330.

M. C. Lewis and G. R. Stewart, "Features Around Embedded Moonlets in Saturn's Rings: The Role of Self-Gravity and Particle Size Distributions", 2009, Icarus, 199, 387-412.

M. Lewis, S. Leutenegger, M. Panitz, K. Sung, and S. A. Wallace, "Introductory programming courses and computer games", Proceedings of the 40th ACM technical symposium on Computer science education, SIGCSE'09, Chattanooga, TN, USA, 204-205.

M. C. Lewis and H. F. Levison, "A Tree-based Hamiltonian for Fast Symplectic Integration", Proceedings of the 2008 International Conference on Scientific Computing, Las Vegas, NV, USA, 30-36.

M. C. Lewis and H. F. Levison, "SwiftVis: Data Analysis and Visualization for Planetary Science", Proceedings of the 2007 International Conference on Modeling, Simulation & Visualization Methods, Las Vegas, NV, USA, 41-47.

M. C. Lewis, G. Kavanagh, and G. R. Stewart, "Parallel Tree Based Gravity for Network Limited Clusters", Proceedings of the 2007 International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, NV, USA, 151-157.

M. C. Lewis and B. L. Massingill, "Multithreaded Collision Detection in Java", Proceedings of the 2006 International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, NV, USA, 583-589.

M. C. Lewis and G. R. Stewart, "Simulating Saturn's Keeler Gap Region", Proceedings of the IASTED International Conference on Modeling and Simulation, Montreal, Quebec, Canada, 2005, 268-273.

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 and G. R. Stewart, "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, 375-380.

M. C. Lewis and G. R. Stewart, "Enhancements to a Methodology for Simulations of Perturbed Planetary Rings", 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 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:
"Experiences with Scala for Introductory CS", invited talk at 5th Annual Scala Workshop

WORLDCOMP Tutorial Scala Ed

WORLDCOMP Tutorial Actor Parallelism

SIGCSE 2014 workshop

"Introduction to Scala and its use in CS education", 2013, tutorial at CCSC-Eastern Conference.

"Dynamics of Colliding Clusters of Millimeter Sized Adhesive Particles", 2013 Annual Meeting of the Division for Planetary Science.

"Using Scala strategically across the undergraduate curriculum", 2013, workshop at the 44th ACM technical symposium on Computer science education.

"Trends in CS enrollment at small, liberal arts institutions", 2013, panel discussion at the 44th ACM technical symposium on Computer science education.

"Optimizing Polyhedra Collision Detection and Handling for Planetary Rings", 2012 Annual Meeting of the Division for Planetary Science.

"Using Scala in CS Education", Tutorial at WORLDCOMP 2012.

"First Programming Language in CS Education - The Argument For Scala", Tutorial at WORLDCOMP 2011.

"Scala, Your Next Programming Language (or if it is good enough for Twitter, it is good enough for me)", Tutorial at WORLDCOMP 2011.

"Negative Diffusion Over Many Synodic Periods", 2011 Annual Meeting of the Division for Dynamical Astronomy.

"Hiding Silicates in Saturn's Rings", 2009 Annual Meeting of the Division for Planetary Science.

"Teaching Java Through Alice and Greenfoot", Tutorial at WORLDCOMP 2009, Las Vegas, NV.

"Propellers in the A ring: Ware are we seeing?", Invited talk for the 2008 European Planetary Science Congress in Muenster, Germany.

"MoonletPropellers: What are we seeing?", 2008 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Collisional Simulations of the F ring with Prometheus and Pandora", 2007 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Swiftvis: Data Analysis And Visualization For Planetary Science Simulations", 2007 Annual Meeting of the American Astronomical Society Division of Dynamic Astronomy.

"Impact Of Size Distributions And Self-gravity On Structures Around Moonlets In Rings", 2007 Annual Meeting of the American Astronomical Society Division of Dynamic Astronomy.

"Simulating the Keeler Gap in Saturn's Rings: Wake and Edge Dynamics", 2006 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"Extended Gravity Wakes in Pan Wakes", 2005 Annual Meeting of the American Astronomical Society Division for Planetary Science.

"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.