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Director of the Computational and Data Science Ph.D. Program  
  
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## Education

Ph.D.	Iowa State University, Ames; 1989 -Major Astrophysics <i>Dissertation:</i> Dynamic and photometric evolutionary models of tidal tails and ripples
B.S.	University of Minnesota, Mankato, Minnesota; Majors – Physics, Astronomy, Mathematics

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## Academic Administration

Middle Tennessee State University – Interdisciplinary Program in Computational and Data Science Ph.D. Program Director

### Administrative duties

I was hired as the first permanent director of the Computational and Data Science Ph.D. Program in 2010. This degree was among the first in the College of Basic and Applied Science. The degree has faculty members from eight different academic departments. As the Program Director, I am responsible for managing admissions, managing GTAs, creating academic structures for degree progression, academic advising, creating cyberinfrastructure for research, managing the \$1 million budget, and helping departments recruit new faculty members to join the university.

### Selected Accomplishments

- Developed a collaborative relationship with eight departments whose faculty participated in the program.
- Effectively managed program resources over 11 years (\$1 million budget, 19 GTA, one staff, computing, and travel funds).
- Substantially improved the curriculum, including creating a Data Science track, a Professional Seminar, and a Capstone course.
- Created the Executive Committee – a governance structure for the degree to include representatives from different departments to help guide the program.
- Successfully managed two external reviews and self-studies of the program in 2015 and 2022.
- Contributed to moving MTSU from a Carnegie R4 university into an R2 university through graduating students and helping recruit new faculty.

- Moved the program from Computational Science to Computational and Data Science in collaboration with the Data Science Institute.
- Created the admissions criteria, qualifying exams format, dissertation proposals, criteria for advancement to candidacy, and pre-defenses.
- Established and managed the admission, qualifying exam, and curriculum standing committees.
- Created and managed the computational infrastructure for the program, including two clusters, a computer lab/classroom,
- Lead the hiring of three faculty members and a system administrator.
- We have increased the number of GTA positions from 19 to 26.
- My program graduated 35 doctoral students and placed them at Oak Ridge National Laboratory, Brown University, Ohio State University, Johns Hopkins University, and other institutions.
- Maintained an active research program in galaxy dynamics, using crowd-sourced data in machine learning, and augmented reality included externally funded research grants.

## George Mason University – Department of Computational and Data Science Undergraduate Program Coordinator – January 2007 to May 2010

### Administrative duties

In the Institute for Computational Sciences and Informatics and the School of Computational Sciences at Mason, research productivity was the only metric for success. Therefore, when we formed the College of Science, there was a need to focus on undergraduate education within the Computational Science Program. As the Undergraduate Program Coordinator in the Department of Computational and Data Science, I led this transition. During the first year that this Department was created, I led the effort to build a new undergraduate major and minor in Computational and Data Sciences. My duties included creating the degree, developing new courses, recruitment, and advising students. Since this work was being done in 2007, this was one of the country's first undergraduate Data Science programs.

### Selected Accomplishments

- Collaborated across departments to create a new undergraduate major and minor in Computational and Data Science.
- Developed new general education courses in Computational and Data Science (including "CDS 130: Computing for Scientists") to increase student credit hours within the Department. This course has played a vital role in making the Department viable.
- Obtained funding for developing the new undergraduate Data Science courses through an NSF grant: "Curriculum for an Undergraduate Program in the Data Sciences: CUPIDS" effort.
- Advised and recruited majors and minors into the program.
- Developed and taught courses within the undergraduate and graduate program.
- I was a finalist in the Krell Institute Undergraduate Computational Engineering and Science Award for my work on this new curriculum.

## Program Director, Undergraduate Research in Computational Mathematics - 2007-2009

### Administrative Duties

As part of the new undergraduate effort in computational science, I led the formation of a cross-departmental collaboration to develop an undergraduate mentorship program in computational mathematics. From March 2007

to May 2009, I served as the Program Director for this NSF grant. Currently, I am mentoring one undergraduate student under the same grant. The Undergraduate Research in Computational Mathematics (URCM) program was funded grant through the "Computational Sciences for Undergraduate Students in the Mathematical Sciences (CSUMS)" program through the National Science Foundation. Mason was one of the five projects chosen nationally for funding during the first year of this NSF program. We had several year-long cohorts in this program. Each year had approximately ten students enrolled.

#### Selected Accomplishments

- Created cross-departmental collaboration to encourage mathematics students to learn computing skills.
- Co-led the writing of the grant to fund the project.
- Developed a faculty team to mentor the students.
- Recruited students into the program.
- Taught and mentored students through an intensive five-week summer course in scientific computing and led the weekly seminar throughout the academic year.
- Helped students develop and present presentations at regional conferences.
- Acted as the academic advisor for undergraduate majors and minors.

#### Astrophysical, Planetary, and Space Science Program Chair – George Mason University- 2004-2007

##### Administrative duties

From 2004-2007, I created and served as the Chair for the Program in Astrophysical, Planetary, and Space Sciences (APSS) within the School of Computational Science. During this period, I supervised the faculty, led a new research group in Space Weather, developed the faculty through hiring adjuncts, and improved the space sciences track within the Computational Sciences Ph.D. Because of the unusual nature of our School, it was essential to build close ties between the Department of Physics and Astronomy and our program. Faculty in my program and those in the Department of Physics and Astronomy regularly taught in each other's programs. We worked closely together on projects of mutual interest, including hiring new faculty members. With the reorganization and the formation of the College of Science in 2007, the Program in Astrophysical, Planetary, and Space Science split between the Department of Computational and Data Sciences and the Department of Physics and Astronomy.

##### Selected Accomplishments

- Built interdepartmental collaboration to create a new academic and research group.
- Collaborated with faculty and external partners to obtain funding from NASA and NSF to create the program.
- Recruited, mentored, and onboarded three new tenure-track faculty members and five new research faculty members.
- Mentored new faculty members to help them obtain funding, including two NSF Career awards and one Presidential Award.

#### Director of Computing, School of Computational Sciences - George Mason University -2003-2004

##### Administrative duties

As the computing needed in the School increased, I was in charge of administering the computing infrastructure required for graduate education and research. I provided leadership in the School of Computational Sciences for computing resources, including managing the system administrators, overseeing the maintenance of computing

labs, developing a computing cluster, and configuring a new server room. I stepped down from this position when I became the Program Chair in Astrophysical, Planetary, and Space Sciences.

### Accomplishments

- Configuration and design of a new server room for the School.
  - Helped create the first computing cluster on campus.
  - Upgraded School workstations and equipment in the computing labs.
  - Improved the software configuration available to students.
  - Hired a second system administrator to help manage the resources.
  - Helping create a new graduate-level high-performance computing course to help students use the latest resources.
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### Other Appointments

- Visiting Fellow, Mansfield College, Oxford University, January – March 2011
  - Professor of Computational and Data Science, George Mason University 2010
  - Associate Professor of Computational and Space Science, George Mason University 1998-2009
  - Assistant Professor of Computational and Space Science George Mason University 1992-1998
  - Associated Western Universities Fellow, X-division, Los Alamos National Laboratory 1999-2000
  - NRL-NRC Postdoc, Naval Research Laboratory
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### Professional Affiliations

- Member of the American Astronomical Society
  - Member Society of Industrial and Applied Mathematics
  - Member of the International Astronomical Union
  - Member of Sigma Xi and Sigma Zeta Honor Society
  - Member of Sigma Pi Sigma Physics Honor Society
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### Teaching

#### Courses Developed and Created at MTSU

- COMS 7950 – A Research Seminar - A seminar course to build a broader understanding of problems and research topics in computational science through the advanced reading of selected journal articles, group discussion, and presentations by external and internal speakers in computational science.
- COMS 7654 -Professional Seminar – Focuses on a specific topic each semester. Topics include themes such as the grant proposal preparation process, making successful presentations, and publishing research in the field. It may be repeated with different topics.

- COMS 7900 – Capstone - Requires students to apply advanced computing and mathematics to solve problems in natural and applied sciences. Students are expected to use parallel computing, advanced simulation, and data mining techniques to solve a research problem in collaboration with an advisor. Course co-taught by two faculty members from different departments. Final presentations are open to students, faculty, and visitors.
- COMS 7700 - Advanced Topics in Computational Science – Advanced topics and protocols specific to different subdivisions of computational science not covered in core or elective courses offered through the program. Students will work under the direct supervision of the instructor.
- COMS 7840 – Selected topics in the natural and applied sciences for Computational and Data Science students. Provides an opportunity to study applications of computational techniques to real-world problems and enhance the domain knowledge of students within the program. Rotating topics may include computational chemistry, computational physics, and computational biology.

### Courses Taught at MTSU

- ASTR 1030 – Exploring the Universe – Introductory course in Astronomy for non-science majors. Topics include the history of astronomy, motion in the sky, planets, stars, galaxies, and cosmology.
- ASTR 1031 – Laboratory for Exploring the Universe – Laboratory course for the ASTR 1030 course.
- PHYS 2021 – Physics Problems Laboratory II -. Optics, modern physics, and electronics traditionally covered in a second-semester college physics course. Reflection and refraction, vision, diffraction effects, quantum mechanics, atomic and nuclear physics, and analog and digital electronics. The skills associated with developing experimental investigations, including graphical analysis and estimation of uncertainties, were emphasized.
- PHYS 7400 – Computational Physics – Advanced simulation course for Computational Science Ph.D. students. Topics include n-body simulations, gravity, validation and verification, optimization, and numerical accuracy.
- COMS 6100 – Fundamental of Computational Science – Core course for Computational Science Ph.D. students. Topics include numerical methods, scientific programming, analysis of algorithms, data structures.
- COMS 6500 – Numerical Methods - Fundamentals of problem-solving approaches in computational science, including computer arithmetic and error analysis, linear and nonlinear equations, least squares, interpolation, numerical differentiation and integration, optimization, random number generations, and Monte Carlo simulation. Students will gain computational experience by analyzing case studies using modern software packages such as MATLAB.
- COMS 7950 – Research Seminar - A seminar course to build a broader understanding of problems and research topics in computational science through the advanced reading of selected journal articles, group discussion, and presentations by external and internal speakers in computational science.
- COMS 7654 -Professional Seminar – Focuses on a specific topic each semester. Topics include themes for advancing graduate students' professional knowledge such as grant proposal preparation process, making successful presentations, and publishing research in the field.
- COMS 7900 – Capstone - Requires students to apply advanced computing and mathematics to solve problems in natural and applied sciences. Students are expected to apply parallel computing, advanced simulation, and data mining techniques to solve a research problem in collaboration with an advisor. Course co-taught by two faculty members from different departments. Final presentations are open to students, faculty, and visitors.

- DATA 6300 - Data Understanding – Applications used to understand problem-solving for data science. Data collection and cleansing techniques are used to visualize and summarize the data to prepare it for modeling various data types through statistical analysis with Python programming.

## Courses Taught at GMU

- CSI 702 – High-Performance Computing – This is one of the core courses for the Ph.D. in Computational Science and Informatics and the master's degree in computational science. Topics include MPI, OpenMP, Threads, CUDA, and optimization.
- CSI 701/801 – Foundations of Computational Science – A core course for the Ph.D. and master's program. Topics include advanced numerical methods, basic software construction and engineering, verification/validation, optimization, an overview of high-performance computing.
- CSI 788 – Large Scale Physical Simulations – An elective for graduate students in Computational Science and Physics. Topics include grid-based simulations, multi-dimensional/multi-physics simulations, code development, software engineering, and group projects.
- CSI 761 – N-body Methods and Particle Techniques – An elective for graduate students in Computational Science, Physics, Astronomy, Chemistry, and Biology. Topics include direct n-body simulations, particle integrators, particle-mesh codes, hierarchical tree codes, gravity, star clusters, smoothed particle hydrodynamics, and mesh-less methods.
- CSI 661/Astro 530 – Astrophysics – A graduate elective for students in the Computational Sciences, Astronomy, Space Weather, and Physics programs. Topics include stellar atmospheres, radiative transfer, stellar interiors, spectra.
- Math 495 – Undergraduate Mathematics Seminar – An undergraduate requirement for students in the *Undergraduate Research in Computational Mathematics Program*. Topics include jobs in computational science and presenting seminars, poster papers, and writing papers for scientific journals.
- Physics 305 – Electricity and Magnetism – An undergraduate core course for physics majors. Topics include electrostatics and magneto-statics, electro-dynamics, and magneto-dynamics.
- Astro 105/106 (later renumbered to Astro 111/113) – Introduction to Astrophysics – A general education course for non-science majors. This course is typically a large lecture section with 300 students. Topics include the solar system, star formation, galaxies, and cosmology – presented with little mathematics.
- CDS 101 – Introduction to Computational Science – An undergraduate general education elective in the Natural Sciences for science and non-science majors - a new course created within the new Undergraduate CDS Major. Topics include foundations of how computers work, storing and manipulating data, signal and image processing, visualization, numerical simulation, and high-performance computing – presented with little mathematics.

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## Research Experience

### Research Areas

- Understanding the gravitational interactions in the universe using various computational and observational techniques to link numerical models with data. This project aims to connect dynamical parameters associated with galaxy interactions (time since the collision, mass ratios, etc.) to star formation rates and morphology.
- Using crowd-sourced data to train neural networks in complex image identification tasks. The current project is focused on identifying characters in Ancient Greek manuscripts. This research focuses on how well machines can learn from imperfect data in a broader sense.
- Exploring how mixed reality systems can be used in post-secondary STEM classrooms. Currently, this involves developing a scriptable interface for M.R., developing laboratory modules, and then testing it in the classroom.

### Grants and Contracts

#### Scientific and Technical Grants

1. "Cybertechnology Development and Exploration of Learning Processes in Augmented Reality Team Environments (CyberlearnAR)" National Science Foundation - IIS - Cyberlearn & Future Learn Tech, John Wallin (P.I.), \$300k, 10/1/2020-9/30/2023
2. "International Conference on Graph Theory and Application," National Science Foundation – NSF Research and Related Activities, PI Dong Ye, Xiaoya Zha, Donald Nelson, Chris Stephens, and John Wallin (Co-PIs). \$12k, 7/15/2014-1/13/2016
3. "Improving Minority Student Success through Data-Driven Analysis" – TBR PI: Cen Li (MTSU), Co-PIs: Michael Hein, Qiang Wu, John Wallin - \$40,000 budget from 6/1/2014 to 5/31/2015
4. FRCAC "Identification of Fragmentary Greek Papyri using Genetic Sequence Algorithms"- Hyrum Carroll PI, Co-PI J. Wallin \$7350, 12/1/2014 to 11/30/2015
5. "Resurrecting Early Christian Lives" -NEH/NSF Digging into Data Challenge: Total funding: approximately \$175k - \$24,975 for MTSU from 2/1/2014 to 1/31/16 (sub-award from the University of Minnesota) – co-PI Wallin
6. "CDI-Type II: Zooniverse - Conquering the Data Flood with a Transformative Partnership between Citizen Scientists and Machines," National Science Foundation – Cyber-Enabled Discovery and Innovation Program, Lucy Fortson (Project P.I.), John Wallin (Co-PI and Institutional P.I.) – total award \$1.89 Million overall funding (\$415k MTSU), award period 2011-2014
7. "X-ray Emission from Two Collisional Ring Galaxies," NASA/Smithsonian Astrophysical Observatory, John Wallin (P.I.) – XMM-Newton X-ray Observatory – 60k seconds of satellite time, \$38k funding, award period 2005-2007
8. "Observations of High-Velocity Outflows in Ring Galaxies," NASA/Smithsonian Astrophysical Observatory, John Wallin (P.I.) – Chandra Observatory - 40k seconds satellite time, \$38k funding, award period 2003-2005

9. "Cooperative Agreement between QSS and GMU to Support the Space Science Data Operations Office at Goddard Space Flight Center," John Wallin (P.I.) – award \$50k, award period 2003-2004
10. "The Redshift Dependence of the Interaction-Activity Connection among Ultraluminous Starbursting Galaxies," NASA Astrophysics Theory Program, Kirk Borne (project P.I.), John Wallin (GMU PI), total award \$221k (\$88k to GMU), 1999-2003
11. "Statistical Visualization Research for Presenting Environmental Summaries Describing Database Quality and Communicating Result to the Public," EPA Cooperative Research, Daniel Carr (P.I.), John Wallin (Co-I) – total award \$258k, award period 1997-1999
12. "Observations of Interacting Ring Galaxies," John Wallin (P.I.) – total award \$4k (AAS Small Research Grant) – award period 1995-1996
13. "Ring Galaxies Observations at the ATNF," John Wallin (P.I.) – total award \$1k (NRAO foreign travel program), award period 1994
14. "The Connections between Dynamics and Star Formation in Interacting Galaxies," GMU College of Science, J. Wallin (P.I.) – total award approximately \$20k, used to support full-time CSI Doctoral Student Chang-Hong Chien during the 1994-1996 academic years. (College of Arts and Sciences Competitive Award)
15. "A Common Data Standard for Catalogs from Digitized Optical Sky Surveys," NASA/Astrophysics Data Program, D. Yentis, NRL (P.I.), John Wallin (Co-I) – total award \$275k - award period 1993-1995
16. ONR Mathematical Sciences, "Development of a Massively Parallel Particle-Mesh Algorithm for Simulations of Galaxy Dynamics and Plasmas," John Wallin (P.I.) – total award \$50k, award period 1993-1994
17. "Observations of Two Compact Groups of Galaxies," NASA/ROSAT AO-2, John Wallin and Michael Kowalski, [H. Gursky Administrative P.I. – total award \$25k, award period 1991-1992

#### Educational Grants

1. "*Learning Assistants as a Means to Improve Student Retention in Introductory Physics and Astronomy*" – TBR - P.I. Ron Henderson, \$28935, 7/1/2014 – 6/30/2015
2. "A Curriculum for an Undergraduate Program in the Data Sciences: CUPIDS," National Science Foundation - Curriculum, Course, and Laboratory Improvement Program (CCLI), J. Wallin (P.I.), Kirk Borne, James Gentle, Robert Weigel, Daniel Carr, Edward Wegman, (Co-PIs) – total award \$150k for developing a new undergraduate program in the Data Sciences, award period 2007-2009
3. "CSUMS: Development of an Ongoing Program of Undergraduate Computational Mathematics Research," National Science Foundation - Computational Science for Undergraduates in the Mathematical Sciences Program, Timothy Sauer (P.I.), Daniel Anderson, Evelyn Sanders, John Wallin, and Thomas Wanner (Co-PI's) – total award \$1.1 million – award period 2007-2011; Program Director 2007-2009, Project Mentor 2009-2010
4. "Can Information Technology Really Reduce the Unit Costs of College Teaching?" Andrew Mellow Foundation, Steven Ruth (P.I.), John Wallin (invited participant) – total award \$390k, award period 1997-1999
5. "HPC in the Curriculum," ARPA, P. Denning (P.I.), G. Atallah, C. Dede, J. Gerstener, M. Kafatos, D. Menasce, S. Setia, D. Sprague, John Wallin, and E. White (Co-I's) - total award \$3.1 Million, award period 1993-1996
6. "Educating Engineers to Design Complex Systems," National Science Foundation, P. Denning (P.I.), C. Dede, O. Frieder, J. Gentle, C. Jensen, M. Kafatos, D. Menasce, D. Rine, and John Wallin (Co-I's) - total award \$156,000, award period 1994-1996



#### Infrastructure Grants

1. National Science Foundation, Faculty Development in Space Weather Research: A Systems Perspective, John Wallin (P.I.), R. Weigel (Co-I), + other Mason faculty, to fund a new faculty line in Computational Space Weather, total award \$952k, award period 2005-2010
2. National Science Foundation, SCREWS Program, "Mathematical Applications with a Parallel Beowulf System," J. Gentle (P.I.), T. El-Gazawi, E. Blaisten, D. Carr, R. Lohner, J. Wallin, and Edward Wegman, 2000-2002, approximately \$100k for computing infrastructure.

#### Selected Astronomical Observations Awards and Telescope Time Allocations

1. Very Large Array Telescope, March 1995, "21 cm Radio Observations of the Jets in NGC 1097" - James Higdon (P.I.), John Wallin (Co-I)
2. Very Large Array Telescope, March 1995, "21 cm Radio Observations of Arp 10" - John Wallin (P.I.)
3. Australian Telescope Compact Array, July 1994, "21 cm Radio Observations of Interacting Ring Galaxies" - John Wallin (P.I.)
4. Cerro Tololo Inter-American Observatory, September 1993, "Near-Infrared Observations of Ring Galaxies" - John Wallin (P.I.)
5. Australian Telescope Compact Array, February 1993, "21 cm Radio Observations of Interacting Ring Galaxies" - John Wallin (P.I.)
6. Very Large Array Telescope, June/July 1992, "21 cm Radio Observations of AM1354-250" - John Wallin (P.I.)
7. Cerro Tololo Inter-American Observatory, August 1991, "Redshifts of ROSAT Selected Clusters" - John Wallin (Co-I), Chris Collins (P.I.)
8. Cerro Tololo Inter-American Observatory, May 1991, "Broadband Optical Colors of Two Interacting Ring Galaxies" - John Wallin (Co-I)

## Publications

### Journal Articles

1. "JSPAM: A restricted three-body code for simulating interacting galaxies," Holincheck, A., Wallin, J., and Harvey, A. 2016, *Computing and Astronomy*, 16, 26
2. "Galaxy Zoo: Mergers- Dynamical Models of Interacting Galaxies," Holincheck, A., Wallin, J., Borne, K., Fortson, L., Lintott, C. Smith, A., Bamford, S. Keel, W, Parrish, M. 2016, the *Monthly Notices of the Royal Astronomical Society*, 459(1), 1
3. "Classification of large acoustic datasets using machine learning and crowdsourcing: Application to whale calls," Shamir, L., Yerby, C., Simpson, R., von Benda-Beckman, A., Tyack, P., Lintott, C., and Wallin, J. 2014, *The Journal of the Acoustical Society of America*, 135, 953
4. "Combining Human and Machine Learning for Morphological Analysis of Galaxy Images", Kuminski, Evan, George, Joe, Wallin, John, and Shamir, Lior. 2014, *Publications of the Astronomical Society of the Pacific*, 126, 959-967. DOI:10.1086/678977
5. "Automatic detection and quantitative assessment of peculiar galaxy pairs in the Sloan Digital Sky Survey," Shamir, L. and Wallin, J., the *Monthly Notices of the Royal Astronomical Society*, 443 (4), 3528
6. "Automated quantitative morphological analysis of interacting galaxies," Shamir, L., Wallin, J., Holincheck, A. 2013, *Astronomy and Computing*, Volume 2, p. 67-73. DOI:10.1016/j.ascom.2013.09.002
7. "Practices in source code sharing in Astrophysics," Shamir, L., Wallin, J., Allen, A., Berriman, B., Teuben, P., Nemiroff, R., Mink, J., Hanisch, R., and DuPrie, K. 2013, *Astronomy and Computing*, Volume 1, 54-58. DOI:10.1016/j.ascom.2013.04.001
8. "Running Unstructured Grid Based CFD Solvers on Modern Graphics Hardware," Corrigan, A., Lohner, R., Cameli, F., Wallin, J. 2010, *International Journal for Numerical Methods in Fluids*, 10, 1002
9. "How Well Do We Know the Orbits of the Outer Planets," Page, G.L., Dixon, D.S., and Wallin, J. F. 2009, *Astrophysical Journal*, 697, 1226
10. "Dynamical Parameters for AM 0644-741," Antunes, A. and Wallin, J. 2007, *Astrophysical Journal*, 670, 261
11. "Testing Gravity in the Outer Solar System: Results from Trans-Neptunian Objects," Wallin, J. F., Page, G. L., and Dixon, D. S., 2007, *Astrophysical Journal*, 666, 1296
12. "Can Minor Planets Be Used to Assess Gravity in the Outer Solar System?" Page, G. L., Dixon, D. S., and Wallin, J. F. 2006, *Astrophysical Journal*, 642, 606
13. "Pattern Speeds of BIMA SONG Galaxies with Molecule-dominated Interstellar Mediums Using the Tremaine-Weinberg Method," Rand, R. J. and Wallin, J. F. 2004, *Astrophysical Journal*, 614, 142
14. "A Minor-Merger Interpretation for NGC 1097's 'Jets'," Higdon, J. L. and Wallin, J. F. 2003, *Astrophysical Journal*, 585, 281
15. "A Performance Comparison of Tree Data Structures for N-Body Simulation," Waltz, J., Page, G. L., Milder, S. D., Wallin, J., and Antunes, A. 2002, *Journal of Computational Physics*, 178, 1
16. "Two New Templates for Epidemiology Applications: Linked Micromap Plots and Conditions Choropleth Maps," Carr, D. B., Wallin, J. F., Carr, D. A. 2000, *Statistics in Medicine*, 19, 17
17. "Wheels of Fire 3: Massive Star Formation in the 'Double-Ringed' Ring Galaxy AM0644-741," Higdon, J. L. And Wallin, J. F. 1997, *Astrophysical Journal*, 474, 686
18. "Dynamically Induced Star Formation in Galaxies from the Passage of Globular Clusters," Wallin, J. F., Higdon, J. L., and Staveley-Smith, L. 1996, *Astrophysical Journal*, 459, 555
19. "AM 1354-250: Photometric Observations and Models of a Collisional Ring System," Wallin, J. F. 1995, *Astrophysical Journal*, 453, 641
20. "Observations and models of the 'Sacred Mushroom': AM 1724-622," Wallin, J. F. and Struck-Marcell, C. 1994, *Astrophysical Journal*, 433, 631

21. "A giant arc in a ROSAT-detected cluster of galaxies," Edge, A. C., and 23 colleagues 1994, *Astronomy and Astrophysics*, 289, L34
22. "Ten new BL Lacertae objects discovered by an efficient X-ray/radio/optical technique," Schachter, J. F., and 10 colleagues 1993, *Astrophysical Journal*, 412, 541
23. "Mass transfer and loss in interacting disk galaxies," Wallin, J. F. and Stuart, B. V. 1992, *Astrophysical Journal*, 399, 29
24. "The evolutionary history of the interacting Galaxy system NGC 7714/7715 (Arp 284)," Smith, B. J. and Wallin, J. F. 1992, *Astrophysical Journal*, 393, 544
25. "Dynamical and photometric models of star formation in tidal tails," Wallin, J. F. 1990, *Astronomical Journal*, 100, 1477
26. "A multicolor photometric study of the tidal features in interacting galaxies," Schombert, J. M., Wallin, J.F., and Struck-Marcell, C. 1990, *Astronomical Journal*, 99, 497
27. "A collisional model for the formation of ripples in early-type disk galaxies," Wallin, J. F. and Struck-Marcell, C. 1988, *Astronomical Journal*, 96, 1850
28. "Arp 227 - A case for shells without mergers?" Schombert, J. M. and Wallin, J. F. 1987, *Astronomical Journal*, 94, 300

#### Conference Proceedings

1. "Exploring Learning Approaches for Ancient Greek Character Recognition with Citizen Science Data," Swindall, Matthew; Croisdale, Gregory; Hunter, Chase; Keener, Ben; Williams, Alex; Brusuelas, James; Krevans, Nita; Sellew, Melissa; Fortson, Lucy & Wallin, John. 2021 IEEE 17th International Conference on eScience (eScience), 2021, pp. 128-137, doi: 10.1109/eScience51609.2021.00023.
2. "Using two-factor similarity scoring functions to quantify and optimize the morphological similarity of models of interacting galaxies," West, G., Ogden, M., Wallin, J. F., *Astronomical Data Analysis Software and Systems XXX*, ESA, Virtual, Granada, Spain. (November 9, 2020). To appear in the Conference Proceedings of the Astronomical Society of the Pacific. <https://schedule.adass2020.es/adass2020/talk/DATN7H/>
3. "Optimizing Numerical Simulations of Colliding Galaxies. I. Fitness Functions and Optimization Algorithms," West, G., Ogden, M., Wallin, J., Sinkala, Z., & Smith, W. (2020). *Research Notes of the AAS*, 4(8), 136. <https://iopscience.iop.org/article/10.3847/2515-5172/abad9b/meta>
4. "Optimizing Numerical Simulations of Colliding Galaxies. II. Comparing Simulations to Astronomical Observations," Ogden, Matthew, Graham West, John Wallin, Zachariah Sinkala, and William Smith. *Research Notes of the AAS* 4, no. 8 (2020): 138. <https://iopscience.iop.org/article/10.3847/2515-5172/abad9c/meta>
5. "Applying Data Science Methods for Predicting Student Retention," Cen Li, Qiang Wu, John Wallin, Michael Hains, 2019, The 2019 International Conference on Computational Science and Computational Intelligence (CSCI'19: December 05-07, 2019, Las Vegas, USA)
6. "Astrophysics Source Code Library: Here We Grow Again!" Allen, A, Berriman, B.G., DuPrie, K., Mink, J., Nemiroff, R., Robitaille, T., Schmidt, J., Shamir, L., Shortridge, K., Taylor, M.B., Teuben, P., Wallin, J., 2019, *Astronomical Data Analysis Software and Systems XXVI*
7. "Leveraging Pattern Recognition Consistency Estimation for Crowdsourcing Data Analysis," Shamir, Lior; Diamond, Derek; Wallin, John 2016, *IEEE Transactions on Human-Machine Systems*, Vol 46, Issue 3, P. 474-480
8. Proteus: A Platform for Born Digital Critical Editions of Literary and Subliterary Greek Papyrus Fragments, 2015, A. Williams, A. Santarsiero, C. Meccariello, G. Verhasselt, H. Carroll, J. Wallin, D. Obbink, J. Brusuelas, *IEEE Digital Heritage 2015(2)*, pp. 453-456
9. "Astrophysics Source Code Library Enhancements," Hanisch, R. J., Allen, A., Berriman, G. B., DuPrie, K., Mink, J., Nemiroff, R. J., Schmidt, J., Shamir, L., Shortridge, K., Taylor, M., Teuben, P. J., and Wallin, J., *Astronomical Data Analysis Software and Systems XXIV (ADASS XXIV)*, Vol. 495, pp. 453- Published 9/2015, DOI
10. "Proteus: A platform for born digital critical editions of literary and subliterary papyri," Williams, A., Santarsiero, A., Meccariello, C., Verhasselt, G., Carroll, H., Wallin, J., Obbink, D., and Brusuelas, J. 2015, *Digital Heritage* <https://doi.org/10.1109/DigitalHeritage.2015.7419546>

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32. "Dynamic and photometric evolutionary models of tidal tails and ripples," Wallin, J. F. 1989, Ph.D. Thesis

#### Educational Articles

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2. "Web-Based Education Coming of Age," Wallin, J. 2001, *Sky and Telescope*, 101, 77
3. "Distance learning and the World Wide Web," Wallin, J. F and Donnelly, D. 1998, *Computers in Physics*, 12, 322
4. "Astronomy Education on the Web," Wallin, J. 1997, *Sky and Telescope*, 94, 68

#### Professional White Papers

1. "Astroinformatics: A 21<sup>st</sup> Century Approach to Astronomy," Lead Author: Borne, K. with 90 other astronomers, a State of the Profession Position paper submitted to Astro2010 Decadal Survey
2. "Citizen Science: Status and Research Directions for the Coming Decade," Raddick, J., Bracy, G., Carney, K., Gyuk, G., Borne, K. Wallin, J. and Jacoby, S., a State of the Profession Position paper submitted to Astro2010 Decadal Survey
3. "The Revolution in Astronomy Education: Data Science for the Masses," Borne, K. D., Jacoby, S., Carney, K., Connolly, A., Eastman, T., Raddick, J., Wallin, J.; Becla, J., Castelez, M., Connors, A. and 13 co-authors, a State of the Profession Position paper submitted to Astro2010 Decadal Survey
4. "Development of a Massively Parallel Particle-Mesh Algorithm for Simulations of Galaxy Dynamics and Plasmas," Wallin, J. 1996, *Center for Earth Observing and Space Research Technical Report*

#### Web-based publications and projects

1. "The AL-PUB dataset", Swindall, Matthew; Croisdale, Gregory; Hunter, Chase; Keener, Ben; Williams, Alex; Brusuelas, James; Krevans, Nita; Sellew, Melissa; Fortson, Lucy & Wallin, John. <https://data.cs.mtsu.edu/al-pub/>
2. "SDSS peculiar galaxy pairs list," L. Shamir, J. Wallin VizieR On-line Data Catalog: J/MNRAS/443/3528. Bibliographic code: 2018yCat..74433528S. <https://vizier.cds.unistra.fr/viz-bin/VizieR?-source=J/MNRAS/443/3528>
3. Lead Data Analyst– Zooniverse Ancient Lives Project <http://ancientlives.org>
4. P.I. – Zooniverse Galaxy Zoo Mergers project – <http://mergers.galaxyzoo.org>
5. Developed the course Wiki for CDS 101 course – <http://cds101.org> (obsolete)
6. Technical editor and designer for "Laboratory Statistics" web-based course. Developed for UOL Publishing and the American Chemical Society (obsolete)
7. Developed electronic homework system for Astro 106 Courses from Fall 1994-1999 (<http://astro.gmu.edu>) (obsolete)
8. Helped develop and create World Wide Web Server for the "Center for the New Engineer" to teach undergraduates the concepts of parallel programming (under NSF grant, P. Denning, PI) – <http://cs.gmu.edu/cne/>

## Science Abstracts

1. "The Astrophysical Source Code Library by the numbers," Alice, DuPrie, Teuben; Peter, Berriman, G. Bruce; DuPrie, Kimberly; Mink, Jessica D.; Nemiroff, Robert J.; Schmidt, Judy; Shamir, Lior; Shortridge; Wallin, John F.; and Warmel, Rein. American Astronomical Society Meeting Abstracts, Vol. 231, pp. 150.10- Published 1/2018
2. "Top Ten reasons to register your code with the Astrophysics Source Code Library," Alice, DuPrie, Kimberly, Schmidt, Judy, Berriman, G. Bruce, Hanisch, Robert J., Mink, Jessica D., Nemiroff, Robert J., Robitalille, Thomas; Schmidt, Judy; Shamir, Lior, Shortridge, Keith, Taylor, Mark B., Teuben, Peter J.; Wallin, John F., and Warmel, Rein. American Astronomical Society Meeting Abstracts, Vol. 229, pp. 229.13- Published 1/2017
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4. "Improving Software Citation and Credit, " Allen, Alice, Berriman, G. Bruce, DuPrie, Kimberly, Mink, Jessica, Nemiroff, Robert, Robitaille, Thomas, Shamir, Lior, Shortridge, Keith, Taylor, Mark, Teuben, Peter, and Wallin, John, ArXiv e-prints, Vol. pp. arXiv:1512.07919- Published 12/2015, DOI
5. "JSPAM: Interacting galaxies modeller, " Wallin, John F., Holincheck, Anthony, and Harvey, Allen, Astrophysics Source Code Library, Vol. pp. ascl:1511.002- Published 11/2015, DOI
6. "Mining the Galaxy Zoo Database: Machine Learning Applications," Borne, K., Wallin, J., Vedachalam, A, Baer, S., Lintott, C., Darg, D., Smith, A., Fortson, L. 2010, *Bulletin of the American Astronomical Society*, 42, 383
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8. "Computer Models of Gravitational Lensing Systems," Naudus, P., Wallin, J., Marshal, P., 2010, *Bulletin of the American Astronomical Society*, 42, 383
9. \*"Minor Planets as a Probe of the Gravitational Field in the Outer Solar System," Page, G. L., Wallin, J. F., and Dixon, D.S. 2005, *Bulletin of the American Astronomical Society*, 37, 1414
10. \*"X-ray observations of the Interacting Ring Galaxy AM0644-741," Wallin, J., Antunes, A., Higdon, J. L., and Higdon, S. J. 2005, *Bulletin of the American Astronomical Society*, 37, 1386
11. "Mining Large Databases for Evidence of Galaxy Mass Assembly," Borne, K. and Wallin, J. 2004, *Bulletin of the American Astronomical Society*, 36, 1496
12. \*"Optimizing N-body Treecodes on Beowulf Clusters," Wallin, J. and Antunes, A. 2003, Science Data Center Symposium (*Raytheon conference at U of M.D. – "Marriage of Data Centers and High-Performance Computing"*)
13. \*"Convergence on N-body plus SPH," Antunes, A. and Wallin, J. 2001, *Bulletin of the American Astronomical Society*, 33, 1433 (1 citation)
14. "Local Polynomial Regression Hydrodynamics," Wallin, J. F. 2001, *Bulletin of the American Astronomical Society*, 33, 1382
15. \*"MLSPH: An Alternative to Smoothed Particle Hydrodynamics," Wallin, J. F., Dilts, G. A., and Haque, A. 1999, *Bulletin of the American Astronomical Society*, 32, 886
16. "The Astrophysics Source Code Library: <http://www.ascl.net/>," Nemiroff, R. J. and Wallin, J. F. 1999, *Bulletin of the American Astronomical Society*, 31, 885
17. "Artificial Viscosity and Galaxy Models," Wallin, J. F., Olson, K., Haque, A., Milder, S., and Brugioni, J. 1998, *Bulletin of the American Astronomical Society*, 30, 1378
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21. "Design and Performance of a Parallel Particle-Mesh Code as a Solution to the N-body Problem Wallin," J. F. and Shah, I. 1993, *Bulletin of the American Astronomical Society*, 25, 799
22. "U.V. and Multi-frequency Observations of the Quasars 3C 273 and 3C 279," Ramos, E., and 11 colleagues 1993, *Bulletin of the American Astronomical Society*, 25, 1383
23. "Multi-Color Observations and Dynamical Models of the Interacting Ring Galaxy AM1354-250," Wallin, J. F. and Struck-Marcell, C. 1991, *Bulletin of the American Astronomical Society*, 23, 1390
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1. "Fifty Years of Computers in Education," Wallin, J. 1998, *Bulletin of the American Astronomical Society*, 30, 1384
2. "Results from Two Years of Web-Based Astronomy Teaching," Wallin, J. 1996, *Bulletin of the American Astronomical Society*, 28, 1275
3. "Contrasting Styles of Distance Learning at the Graduate and Undergraduate Levels," Zoltek, S. and Wallin, J, 2003, EDUCAUSE Southeast Regional Conference, Atlanta, June 18-20
4. "Astrobiology and its Place in Astronomy Education," Geller, H., Summers, M., Evans, J., Taylor, G., and Wallin, J. 2002, American Association of Physics Teachers National Meeting, 124, DK04,

## Current and Former Research Students

### Undergraduates

- Isaac Shirk (MTSU – Honors/Physics Thesis BS 2021 - Undergraduate Thesis: Creating the Core Components of an Astronomy Lab in A.R.)
- Ethan Lawing (MTSU – Honors/Physics Thesis BS 2021 - Undergraduate Thesis: Galaxy Dynamics)
- William (Pete) Smith (MTSU - Physics Thesis BS 2020 - Undergraduate Thesis: Using the Impulse Approximation as A Heuristic for Quantifying Distortions in Interacting Pairs of Galaxies)
- Lauren Koenig (MTSU - Physics BS 2020 - Undergraduate Thesis: An Interface for Future Comparison of Real and Simulated Interacting Galaxy Pair Morphologies using JSPAM)
- Jackson Cole (MTSU - Physics BS 2018 - Undergraduate Thesis: An Interface for Future Comparison of Real and Simulated Interacting Galaxy Pair Morphologies using JSPAM)
- Nicholas Moore (MTSU – Physics BS 2017 - Undergraduate Thesis: The Pythagorean three-body problem)
- David Shipley (MTSU – Physics BS 2017 - Undergraduate Thesis: Effects of Halo Mass On The Stability of Galactic Disks)
- Lindsey Blankenship (MTSU - Physics BS 2016 - Undergraduate Thesis: Image Tracking and Motion Prediction)
- David Hiller MTSU (MTSU – Physics BS 2014 - Undergraduate Thesis: Attention and Performance Differences in Galaxy Classification by Untrained Volunteers in the Zooniverse Project)
- Ben Bunnell (MTSU – Physic BS 2013 - Undergraduate Thesis: Determination of Fitness of Models of Galactic Collisions)
- Steven LePire (Mason -Math Research, BS 2009)
- Philip Naudus (Mason - Physics Research BS, 2008 - Undergraduate Thesis: Modeling Gravitational Lensing)

### Masters Students

- Alex Williams, Masters in Computer Science, 2014
- Dan Shaw, Masters in Applied Physics, 2007
- Jack Scheible, Masters in Applied Physics, 2004
- Seth Milder, Masters in Applied Physics, 2001
- John Brugioni, Masters in Computational Sciences, 1996

### Doctoral Students

- Matthew Swindall – MTSU, Computational and Data Science Ph.D. Program  
2020- present  
Dissertation Topic: Automated Modeling of Galactic Mergers
- Matthew Ogden – MTSU, Computational and Data Science Ph.D. Program  
2020- present  
Dissertation Topic: Computational Papyrology
- Graham West - MTSU, Computational and Data Science Ph.D. Program  
2015-2021  
Dissertation Title: On fitting the morphology of simulations of interacting galaxies to synthetic d
- Allen Harvey - George Mason, Computational Science and Informatics Ph.D. Program  
2008-2014  
Dissertation Title: Pipeline for Constructing Optimized N-Body Models of Interacting Galaxies



- Anthony Holincheck - George Mason, Computational Science and Informatics Ph.D. Program  
2007-2013  
Dissertation Title: A Pipeline for Constructing a Catalog of Multi-Method Models of Interacting Galaxies
- Andrew Corrigan - George Mason, Computational Science and Informatics Ph.D. Program  
2006-2009  
Dissertation Title: Kernel-based Meshless Methods
- Gary Page- George Mason, Computational Science and Informatics Ph.D. Program  
1999-2009  
Dissertation Title: Exploring the Weak Limit of Gravity at Solar System Scales
- Alex "Sandy" Antunes - George Mason, Computational Science and Informatics Ph.D. Program  
1998-2005  
Dissertation Title: Numerical Simulations of Ring Galaxies: First Rings Events, Star Formation, and AMO644-741
- Aamer Haque - George Mason, Computational Science and Informatics Ph.D. Program  
1994-2005  
Dissertation Title: Calibration of Equations of State and Design of High-Pressure Shock Wave Experiments Using Numerical Simulation
- Charles F. Bradshaw - George Mason, Computational Science and Informatics Ph.D. Program  
1993-2000  
Dissertation Title: Very High-Resolution Trigonometric Parallax and Structure Measurements of Scorpius X-1