

Application Form

Profile

Jeffrey _____ M _____ Brown _____
First Name Middle Initial Last Name

Email Address

_____ Suite or Apt _____
Home Address

_____ WI _____
City State Postal Code

What district do you live in? *

District 4

Mobile: _____
Primary Phone Alternate Phone

Wisconsin Lutheran College Associate Professor of
Employer Job Title Computer Science

Please look at the vacancy page before applying. Some Boards, Committees and Commissions have requirements that they are looking for in an applicant, such as specific skills or member types such as Adult or Student.

The Vacancy page can be found here:

[VACANCIES](#)

Which Boards would you like to apply for?

Bicycle and Pedestrian Facilities Committee: Submitted

Why are interested in joining this Board, Committee or Commission?

[brown_cv.pdf](#)
Upload a Resume

If you have issues uploading your resume, email it to Misty Richey at mrichey@wauwatosa.net

If you need to send your resume separately, complete the remainder of the application, save it, and we will submit both the application and resume for you.

Please tell us about yourself and why you want to serve.

I'm passionate about biking and walking for daily commuting, visiting restaurants/sites, and participating in community events. This past year my family (wife and sons, 4 & 8) have committed to biking to school every day that weather permits. This experience has spurred me on to get involved in helping improve the infrastructure, and contribute to community outreach events to convince more people to bike! I'm excited for the opportunity help!

Demographics



Date of Birth

Once you submit your application, check [here](#) for the Common Council agenda that has your appointment or reappointment. It may be possible that it will be on future agendas and not on the next upcoming meeting date agenda. This will be how you know if you have been appointed or reappointed.

Dr. Jeffrey M. Brown

Assistant Professor



About me

I'm an Associate Professor of Computer Science at Wisconsin Lutheran College. I am passionate about teaching and engaging students, especially by supplementing class curriculum with illustrative computer programs to encourage exploratory learning. I enjoy including students in my research and mentoring them for advancing their chosen career path. My research interests include programming language design, compilers, parallelization techniques, mathematical modeling, numerical methods, and software organization.

Education

2010–2016 **Doctor of Philosophy in Optical Sciences**, *University of Arizona*, Tucson, Arizona, USA

- Thesis: Exactly solvable light-matter interaction models for studying filamentation dynamics
- Committee: Miroslav Kolesik, Jerome V. Moloney, Ewan M. Wright
- Defense date: 11 April 2016

2003–2007 **Bachelor of Science in Optical Engineering**, *Rose-Hulman Institute of Technology*, Terre Haute, Indiana, USA

- Senior design project: Retinal illuminator - A LED-based device to uniformly illuminate the human retina for use in optometric imaging
- Advisors: Robert M. Bunch (Rose-Hulman), Donald T. Miller (Indiana University School of Optometry)
- Minor in German and earned a German Technical Translator's Certificate

Teaching

2024-current **Associate Professor of Computer Science** at Wisconsin Lutheran College. I teach a wide variety of courses within Computer Science and Physics ranging from introductory to advanced.

- Introduction to Programming
- Software Development
- Data Structures
- Computer Networks
- Operating Systems
- Computer Architecture
- Computer Graphics
- Programming Languages
- Senior Capstone
- Classic Electrodynamics
- Quantum Mechanics

2019-2024 **Assistant Professor of Computer Science** at Wisconsin Lutheran College.

2021-current **Supervising a research project** involving multiple undergraduate Computer Science students. We are designing a programming language that aids non-expert programmers in performing numerical simulations. The project gives opportunities for students to work on parsing, transforming abstract syntax trees, type checking, code generation, and numerical methods.

- 2018-2019 **Supervised a research project** for a Master's student. We chose a project that integrated well into my current research. We met on a regular basis and I helped the student choose a physical model, numerical method, and assisted in writing a simulation. We published a paper (D. Langevin 2019) based on the student's work.
- 2017-2018 **Instructor for Numerical Physics course (PHY571)** at École Polytechnique. I prepared in-class lectures, weekly computing exercises, and supervised student groups in semester long projects. The course covers data structures, algorithms, and numerical methods for a wide range of physics domains. The supervised projects included simulations of laser propagation, the time dynamics of Bose-Einstein condensates, plasma dynamics, bird-flocking (swarm AI) and laser-atom interactions.
- 2014-2015 **Mentored and tutored** a middle school student in computer programming projects. The student learned common data structures and algorithms by writing a small 2D game in Python and OpenGL.

Service & Outreach

- 2020-current **Computer Science Department Head.** My responsibilities include course curriculum design and scheduling, managing the department's budget, assessment, advising students, meeting with perspective students, and advocating to administration needs of the department.
- 2023-2024 **HLC accreditation team.** I'm a member of subcommittee 5 tasked with collecting evidence on institutional effectiveness.
- 2021-current **Curriculum Committee.** I have served as a member on the committee (2021-2025). I now serve as chair of the curriculum committee(2025-current) which approves curriculum related changes and additions to all majors.
- 2019-current **Faculty advisor to the STEM Club.** I assist student club members with planning outreach events, such as teaching middle school students programming, and working on club projects.
- 2014 & 2015 **Served on planning committee for a math methods workshop** for incoming graduate students at the Optical Sciences Center, University of Arizona. Designed notes and example problems and presented materials to participants. Program was successful enough in 2014 that the department appropriated funds for its continuation in 2015.
- 2015 **Participated as a panelist** for a Q&A with undergraduate students who were interested in graduate school.

Professional Experience

- 2019-current **Assistant Professor of Computer Science, Wisconsin Lutheran College, Milwaukee, Wisconsin**
I teach a wide variety of computer science and physics courses, manage an undergraduate research project in programming language design, and am currently serving as the Department Head.
- 2019 **Software Consultant, Paris, France**
Part-time consulting for Oxalis-Laser. I contribute to the development of their commercial laser simulation program, by advising them on numerical methods, designing physical models, and adding new user interface features.
- 2016-2019 **Postdoctoral Researcher, Louisiana State University, Baton Rouge, Louisiana**
Investigating laser-matter and laser-plasma interaction phenomena for ultrashort pulse laser sources. My research projects include ab-initio calculations of laser-induced molecular responses, laser propagation in gases and in fibers, and the generation of THz radiation. My position is shared between Louisiana State University and the Center for Theoretical Physics at École Polytechnique (Paris, France).
- 2010–2016 **Research Associate, University of Arizona, Tucson, Arizona**
Investigated exactly solvable laser-matter interaction models that are suitable for use in ultrashort pulse propagation simulations.

2008-2010 **Optical Engineer**, SAIC, Crane, Indiana

Developed and performed testing of a laser-based counter measures system. Created software to automate analysis of test data that shortened analysis time from 6 weeks to 2 days. Performed modeling and simulation of laser system and atmospheric laser propagation.

Honors & Awards

- 2021 **WLC Faculty Mini-Grant**. I received a grant of \$2500 for my research in programming language design. The funds allowed me to hire an undergraduate student researcher to write a parser for a new programming language that aids non-experts in performing numerical simulations.
- 2007 **US Patent #7295771** “Method and Apparatus for Minimizing Ambient Illumination Effects in a Vision System”
- 2003 **Eli Lilly Scholarship recipient** - Full tuition at undergraduate institution

Programming projects

One of my passions is writing code. I maintain a number of open source projects (<https://github.com/brownjm>), some of which are related to my research and others are just for the fun of it. Here's a listing of some of them:

plds (Common Lisp): A programming language for modeling and simulating dynamical systems. As part of my research I am exploring language features for describing differential equations and designing a compiler to generate auto-parallelized code that solves them.

Roguelike Game Engine (C++): An 2D engine for writing a turn-based, roguelike game. Built on top of SDL, it provides interfaces for working with entities, actions, events, as well as audio and graphics.

laser-propagation (C++): Simulation to model intense laser pulses in gases, liquids, and fibers (has produced results for multiple papers).

geometric-optics (Python): Program to teach the basics of geometric optics by plotting how rays travel through various optical elements (lenses, mirrors, etc).

path-tracing (C++): Monte-Carlo method for rendering 3D images of a scene.

tdse-argon (C++): A fast, scalable model of Argon for investigating laser-atom interactions.

tdse (Python): Real-time visualization of a quantum wavefunction in an arbitrary potential using the Time-Dependent Schrödinger Equation (TDSE).

Parameters (C++): Tool for reading/writing simulation parameters using a Conf-like syntax.

Programming languages and libraries

C, C++, Python, Common Lisp (SBCL), Haskell, Bash, Git, PBS, MPI, \LaTeX 2 ϵ

Languages

English (native), French (intermediate), German (intermediate)

List of publications

Peer-reviewed:

1. R. Piccoli, J. M. Brown, et al. “Multimode Nonlinear Optics Yields Few-Cycle Visible Light”, Optics in 2022 December Edition, Optics & Photonics News (2022)
2. L. Neoričić, C. Jusko, S. Mikaelsson, C. Guo, M. Miranda, S. Zhong, F. Garmirian, B. Major, J. M. Brown, M. B. Gaarde, A. Couairon, U. Morgner, M. Kovačev, and C. L. Arnold, “4D spatio-temporal electric field characterization of ultrashort light pulses undergoing filamentation,” Opt. Express 30, 27938-27950 (2022)
3. R. Piccoli, J. M. Brown, et al. “Intense few-cycle visible pulses directly generated via nonlinear fibre mode mixing”, *Nature Photonics* 15, 884-889 (2021)
4. X. Ren, Y. Wang, Z. Chang, J. Welch, A. Bernstein, M. Downer, J. M. Brown, M. Gaarde, A. Couairon, M. Kolesik, and P. Polynkin. “In-line Spectral Interferometry in Shortwave-Infrared Laser Filaments in Air”, *Phys. Rev. Lett.* Vol. 123, Iss. 22, 223203 (2019)
5. D. Langevin, J. M. Brown, Mette B. Gaarde, and Arnaud Couairon. “Determination of molecular contributions to the nonlinear refractive index of air for mid-infrared femtosecond laser pulse excitation”, *Phys. Rev. A* 99, 063418 (2019)
6. J. M. Brown, A. Couairon, P. Polynkin, and M. B. Gaarde. “Analysis of the angular spectrum for ultrashort laser pulses”, *JOSA B*, Vol. 32, Issue 2, pp. A105-A111 (2019)
7. J. M. Brown, A. Couairon, and M. B. Gaarde. “Ab-initio calculations of the linear and nonlinear susceptibilities of N₂, O₂, and air in midinfrared laser pulses”, *Phys. Rev. A* 97, 063421 (2018)
8. J. M. Brown, P. Jakobsen, A. Bahl, J. V. Moloney, and M. Kolesik, “On the convergence of quantum resonant-state expansion”, *J. of Math. Phys.* 57, 032105 (2016)
9. J. M. Brown, C. Shannor, E. M. Wright, and M. Kolesik, “Carrier-wave shape effects in optical filamentation”, *Optics Letters* Vol. 40, Issue 5, pp. 859-862 (2016)
10. J. M. Brown and M. Kolesik, “Properties of Stark resonant states in exactly solvable systems”, *Advances in Mathematical Physics* Vol. 2015, Article ID 125832 (2015)
11. A. Bahl, J. M. Brown, E. M. Wright, and M. Kolesik, “Assessment of the metastable electronic state approach as a microscopically self-consistent description for the nonlinear response of atoms”, *Opt. Lett.* 40, 4987-4990 (2015)
12. M. Kolesik, J. M. Brown, A. Teleki, P. Jakobsen, J. V. Moloney, and E. M. Wright, “Metastable electronic states and nonlinear response for high-intensity optical pulses”, *Optica*, 1, 323 (2015)
13. M. Kolesik, J. M. Brown, J. V. Moloney, and D. Faccio, “History-dependent effects in subcycle-waveform strong-field ionization”, *Phys. Rev. A*, Vol. 90, No. 3, 033414 (2014)
14. M. Kolesik, E. M. Wright, J. Andreasen, J. M. Brown, D. R. Carlson, and R. J. Jones, “Space-time resolved simulation of femtosecond nonlinear light-matter interactions using a holistic quantum atomic model: Applications to near-threshold harmonics”, *Opt. Express*, Vol. 20, Issue 14, pp. 16113-16128 (2012)
15. J. M. Brown, E. M. Wright, J. V. Moloney, and M. Kolesik, “On the relative roles of higher-order nonlinearity and ionization in ultrafast light-matter interactions”, *Opt. Lett.*, Vol. 37, Iss. 10, pp. 1604-1606 (2012)
16. J. M. Brown, A. Lotti, A. Teleki, and M. Kolesik, “Exactly solvable model for nonlinear light-matter interaction in an arbitrary time-dependent field”, *Phys. Rev. A*, Vol. 84, No. 063424 (2011)
17. B. Cense, E. Koperda, J. M. Brown, O. P. Kocaoglu, W. Gao, R. S. Jonnal, and D. T. Miller, “Volumetric retinal imaging with ultrahigh-resolution spectral-domain optical coherence tomography and adaptive optics using two broadband light sources”, *Optics Express*, Vol. 17, Issue 5, pp. 4095-4111 (2009)
18. B. Cense, W. Gao, J. M. Brown, S. M. Jones, R. S. Jonnal, M. Mujat, B. H. Park, J. F. de Boer, and

D. T. Miller, “Retinal imaging with polarization-sensitive optical coherence tomography and adaptive optics”, *Optics Express*, Vol. 17, Issue 24, pp. 21634-21651 (2009)

Proceedings:

1. M. Kolesik, J. M. Brown, and A. Bahl, “Modeling of ultrafast laser pulse propagation”, *Proc. SPIE 9835*, Ultrafast Bandgap Photonics, 983510 (May 13, 2016); doi:10.1117/12.2223428
2. M. Kolesik, J. M. Brown, K. Schuh, S. W. Koch, and J. V. Moloney, “Ultrafast light-matter coupling in condensed and gaseous nonlinear media”, *Proc. SPIE 9186*, Fifty Years of Optical Sciences at The University of Arizona, 91860G (September 5, 2014); doi:10.1117/12.2064270

Conferences & Workshops

1. Attended ACM SIGPLAN’s Programming Language Design and Implementation (PLDI), 2023.
2. Attended Midwest Instruction and Computing Symposium, 2022.
3. Attended (virtual) ACM’s conference Principles of Programming Languages (POPL), 2021
4. Attended (virtual) Midwest Instruction and Computing Symposium, 2020
5. “Modeling laser filamentation in the mid-infrared”, Quantum Dynamics in Tailored Intense Fields (QUTIF) International Conference, Bad Honnef, Germany, 3 September 2017
6. “Modeling ultrashort mid-infrared laser pulses”, 13th Colloquium on Coherent and Incoherent UV, VUV, and X-ray sources (UVX 2016), Chinon, France, 12 October 2016
7. “Metastable state approach for modeling nonlinear light-matter interactions in optical filaments”, Optics and Photonics Winter School and Workshop, College of Optical Sciences at University of Arizona, Tucson, Arizona USA, 7 January 2016
8. “Towards realistic, exactly solvable media models”, Workshop on Mathematical Methods and Models in Laser Filamentation, Centre de Recherches Mathématiques, Montreal, Canada, 12 March 2014
9. “Improvements to the nonlinear medium model for optical filaments”, School on Theory and Mathematical Modeling of Ultrashort Pulse Propagation, University College Cork, Cork, Ireland, 30 July 2013
10. “Testing the standard model for optical filaments: Comparison to exact solutions”, 4th International Symposium on Filamentation COFIL, Tucson, Arizona USA, 9 October 2012
11. “Exactly Solvable 1D Quantum Model to Investigate Non-Linear Phenomena in Intense Laser Pulses”, School on Theory and Mathematical Modeling of Ultrashort Pulse Propagation, Tucson, Arizona USA, 21 March 2011

Seminars:

1. “Resume workshop”, Math and Friends, Wisconsin Lutheran College, 2023
2. “Building a PL for Modeling and Simulation”, Wisconsin Lutheran College, October 2021
3. “Molecular contributions to the nonlinear refractive index of air”, Department of Physics at Louisiana State University, January 2019
4. “Pulse self-compression in an argon-filled capillary”, Department of Physics at Louisiana State University, September 2018
5. “TDDFT calculations of susceptibilities of N₂ and O₂ in the MIR”, Department of Physics at Louisiana State University, March 2018
6. “Sources of CEP dependence in the MIR”, Department of Physics at Louisiana State University, November 2017.
7. “Modeling the propagation of mid-infrared laser pulses”, Department of Physics at Louisiana State University, April 2017
8. “Modeling ultrashort laser pulses in gases”, Centre de Physique Théorique at École Polytechnique, Palaiseau, France, February 2017
9. “Modeling ultrashort mid-infrared laser pulses”, Department of Physics at Louisiana State University, 10 November 2016
10. “Resonant electronic states and their use in modeling of the nonlinear optical response of atoms and molecules”, Modeling and Computation Seminar, University of Arizona Mathematics Department, March 2016