

QUSAI AL SHIDI, PHD

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Ann Arbor, MI

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EDUCATION

Ph.D. Physics, University of Massachusetts—Lowell **May 2019**
B.Sc Physics, University of Toledo **May 2012**

RESEARCH EXPERIENCE

University of Michigan **2019-Present**

Postdoctoral Research Fellow, Research Advisor: Tuija Pulkkinen

- Space Weather and Uncertainty Quantification
- Magnetosphere modeling.
- Magnetosphere-Ionosphere Coupling.

University of Massachusetts--Lowell **2016-2019**

Research Assistant, Research Advisor: Ofer Cohen

- Wrote a two-fluid collisional MHD code from scratch for the solar chromosphere and simulated and analyzed results.

University of Toledo **2011**

Research Experience for Undergraduates (REU), Research Advisor: Jacques Amar

- Thin-film growth simulations
- C & C++ programming

FUNDING

- **Co-I, Proposal (funded) A Flexible Community-based Upper Atmosphere Ensemble Prediction System**
NASA Grant 80NSSC20K1581 **\$2.2M, 2020-2023**
Space Weather with Quantified Uncertainties
- **Co-I, Proposal (funded) Community Coordinated Modeling Center development**
NASA Grant 80NSSC21K1753 **\$241.1K, 2021-2022**
High resolution geomagnetic storm simulations
- **GEM Workshop Early Career Funding** **2021-2022**
National Science Foundation
- **SHINE Workshop Student Funding** **2017-2019**
National Science Foundation
- **Student Advanced Degree Grant** **~\$120K, 2016-2017**
Ministry of Education, Sultanate of Oman

PUBLICATIONS

- **Accuracy of Global Geospace Simulations: How much of the error arises from solar wind input uncertainties?** *Qusai Al Shidi, TI Pulkkinen, DT Welling, G Tóth.* (2023, in preparation) <https://doi.org/10.22541/essoar.168565415.57893357/v1>
- **A Large Simulation Set of Geomagnetic Storms—Can Simulations Predict Ground Magnetometer Station Observations of Magnetic Field Perturbations?**, *Qusai Al Shidi, T. Pulkkinen, G. Toth, A. Brenner, S. Zou, J. Gjerloev.* *Space Weather* (2022) <https://doi.org/10.1029/2022SW003049>
- **Time-Dependent Two-Fluid Magnetohydrodynamic Model and Simulation of the Chromosphere**, *Qusai Al Shidi, Ofer Cohen, Paul Song, Jiannan Tu.* *Solar Physics* (2019) 294:124. [doi:10.1007/s11207-019-1513-8](https://doi.org/10.1007/s11207-019-1513-8)
- **Statistics of geomagnetic storms: Global simulations perspective**, *Tuija I Pulkkinen, Austin Brenner, Qusai Al Shidi, Gabor Toth.* *Frontiers in Astronomy and Space Sciences* (2022) <https://doi.org/10.1029/2022SW003049>
- **What sustained multi-disciplinary research can achieve: The space weather modeling framework**, *Tamas I. Gombosi, Yuxi Chen, Alex Glocer, Zhenguang Huang, Xianzhe Jia, Michael W. Liemohn, Ward B. Manchester, Tuija Pulkkinen, Nishtha Sachdeva, Qusai Al Shidi, Igor V. Sokolov, Judit Szente, Valeriy Tenishev, Gabor Toth, Bart van der Holst, Daniel T. Welling, Lulu Zhao, Shasha Zou.* *J. Space Weather Space Clim.* 11 42 (2021) [doi:10.1051/swsc/2021020](https://doi.org/10.1051/swsc/2021020)
- **Stormtime Energetics: Energy Transport Across the Magnetopause in a Global MHD Simulation**, *Austin Brenner, Tuija I. Pulkkinen, Qusai Al Shidi, Gabor Toth.* *Frontiers in Astronomy and Space Sciences* 8 (2021). [doi:10.3389/fspas.2021.756732](https://doi.org/10.3389/fspas.2021.756732)
- **Simulating Solar Maximum Conditions Using the Alfvén Wave Solar Atmosphere Model (AWSoM)**, *Nishtha Sachdeva; Gábor Tóth; Ward B. Manchester; Bart van der Holst; Zhenguang Huang; Igor V. Sokolov; Lulu Zhao; Qusai Al Shidi; Yuxi Chen; Tamas I. Gombosi et al.* *The Astrophysical Journal* (2021). [doi:10.3847/1538-4357/ac307c](https://doi.org/10.3847/1538-4357/ac307c)

TEACHING EXPERIENCE

- Space Weather Simulations Summer School**, Boulder CO **Summer 2022**
- Taught coding and writing space weather simulations to ~20 diverse students ranging from graduate students to postdocs.
- Space Weather Modeling**, Ann Arbor MI **Spring 2022**
University of Michigan
- Co-instructor teaching programming and analyzing space weather models.
- Teaching Assistantship**, Lowell, MA **2014-2016**
University of Massachusetts—Lowell
- General Physics lab instructor.
- Adjunct Faculty**, Lowell, MA **2014-2016**
University of Massachusetts—Lowell
- Teaching physics recitation to NAVITAS (English as a second language) students.

SCIENTIFIC SOFTWARE

- **swmfpy**
Project Lead 2020-Present
<https://github.com/MSTEM-QUDA/swmfpy>
Project lead that contains helper tools for users of SWMF. found on `pip`.
- **Space Weather Modeling Framework (SWMF)**
Contributor 2019-Present
<https://github.com/MSTEM-QUDA/SWMF>
Contributions to the continuing development of a diverse range of space weather simulation software.
- **Collisional Multi-Fluid Ion (comfi)**
Lead Developer 2018-2019
<https://github.com/qalshidi/comfi>
Wrote a 2.5D simulation of the solar chromosphere from scratch.

PRESENTATIONS

- ***Uncertainties in Geomagnetic Indices due to Solar Wind Propagation***
Poster, GEM Workshop CA, 2023
- ***SWMF Storm Statistics***
Oral Presentation, 4th SWMF Users Meeting MI, 2023
- ***Uncertainties in Simulation of Ground Magnetometer Records Arising From Solar Wind Input Errors***
Invited Poster, AGU Fall Meeting IL, 2022
- ***Space Weather Simulations Summer School***
Invited Poster, AGU Fall Meeting IL, 2022
- ***Simulated Predictions From Solar Wind to Ground Magnetometers***
Magnetosphere Seminar Series Virtual, 2022
- ***Terrestrial Impacts of Global Geospace Modeling of an Ensemble of Storms***
AGU Fall Meeting LA, 2021
Virtual GEM Workshop Virtual, 2020
- ***Two-Fluid Collisional Modeling of the Chromosphere***
Poster SHINE Workshop, 2019
- ***Time Dependent Two-Fluid Model of the Chromosphere***
Oral Presentation, 3rd SWMF Users Meeting U. of Michigan, MI, 2019
Invited Seminar, Lockheed Martin Solar and Astrophysics Lab CA, 2019
Invited Seminar, NASA Goddard Space Flight Center MD, 2019
Invited Seminar, Harvard-Smithsonian Center for Astrophysics MA, 2018
- ***Two-Fluid 2.5 D Magnetohydrodynamic Simulation and Model of the Sun's Chromosphere***
Poster, AGU Fall Meeting DC, 2018
- ***Two-fluid Model of the Sun's Chromosphere***
Poster SHINE Workshop, 2018

COMPUTER SKILLS

- C++, C, Python, MATLAB, GNU Octave, OpenMP
- Parallel Computing
 - NASA Pleiades
 - TACC Frontera
 - U. Mich. Great Lakes
- Space Physics Modeling
 - Magnetohydrodynamics
- Numerical Simulations and Methods
- Data Analysis with Python (numpy, pandas, matplotlib, seaborn)
- General Purpose Computing with GPUs.

Platforms: Linux

SCIENTIFIC SERVICE AND OUTREACH

Journal Topic Coordinator **2023-2024**

- Uncertainty Quantification And Model Validation In Space Weather Modeling
Frontiers in Astronomy and Space Sciences

Peer Review **2022-Continuing**

Peer reviewed a total of 5 times for journals:

- Space Weather
- Science: Advances

MIPSE Graduate Student Symposium Poster Judge **2022, 2019**

Ann Arbor, MI

- Judged and picked winners for graduate student posters for the 10th Annual Michigan Institute for Plasma Science and Engineering (MIPSE) Graduate Student Symposium.

NASA Proposal Reviewer **2019**

- Served on a panel of reviewers for proposals to provide scientific funding.

PROFESSIONAL TRAINING AND WORKSHOPS

OpenACC Hackathon World Tour **2019**

Brookhaven National Lab, NY

- Intensive week-long workshop coding OpenACC into existing code for GPU.

International School for Space Simulations **2018**

UCLA, CA

- Learned to use many kinds of space physics codes like particle-in-cell, MHD and kinetic codes.

Space Weather Summer School **2018**

Boulder, CO

- Week long summer school for graduate students that cover a broad range of physics ranging from the sun to the earth's atmosphere.

SHINE Student Day **2018**

Cocoa Beach, FL

- Workshop on general topics of heliophysics.

C & C++ Programming **2003**
 Qurum Training Institute, Muscat
 • Attained practical coding skills for general software development.

HONORS AND AWARDS

Donalds S Park's Outstanding Program Award **2012**
 University of Toledo, OH
 • Co-coordinated BASHCon XXVII an non-profit convention that spanned 1000 attendees and had a budget of approximately \$10,000.

Donalds S Park's Outstanding Program Award **2011**
 University of Toledo, OH
 • Co-coordinated BASHCon XXVI an non-profit convention that spanned 1000 attendees and had a budget of approximately \$7000.

College of Arts and Sciences Dean's List **Fall 2009**
 University of Toledo, OH

College of Arts and Sciences Dean's List **Spring 2009**
 University of Toledo, OH

COMMUNITY SERVICE

Volunteer Science Fair Judge for Lowell Schools **2015**
 Lowell, MA
 • Judged a general science fair for Lowell Public Schools students.

Graduate Physics Association **2015**
 University of Massachusetts—Lowell, MA
 • Webmaster

Physics and Astronomy Summer Camp **2011**
 Toledo, OH
 • Volunteering with setup and teaching high-school students in an evening of Physics and Astronomy.

College of Arts & Sciences Student Council **2010**
 Toledo, OH
 • Science Delegate

Society of Physics Students **2010**
 Toledo, OH
 • Web Master and Outreach Coordinator

University of Toledo's Feminist Alliance **2012**
 Toledo, OH
 • Recorder and volunteer
 • Attended the National Young Feminists Leadership Conference in Washington, DC. March 2012.

UT-BASH **2010-2012**
 Toledo, OH
 Student Club for board games and others. Took leadership roles such as:
 • Vice President, Toledo, OH **2010**

- President, Toledo, OH
- BASHCon Coordinator, Toledo, OH

2011
2011-2012.

LANGUAGES

English: First Language, fluent speaker, advanced writer.
Arabic: Native Language

REFERENCES

Dr. Tuija Pulkkinen

Postdoctoral Research Supervisor
University of Michigan,
Climate and Space Sciences and Engineering,
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