

Benjamin L. Alterman

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EDUCATION

University of Michigan

2012 – December, 2018 (Expected)

PhD, Applied Physics expected 2018

Thesis topic: *In Situ Kinetic Physics of the Solar Wind at 1 AU with the Wind Faraday cups*

Advisors: Dr. Justin C. Kasper & Dr. Stefano Livi

GPA: 3.70

Macalester College

2008 – 2012

B.A., Physics & Philosophy

Physics Capstone: *Collider Phenomenology of the Singlet Scalar*

Advisor: Dr. Tonnis ter Veldhuis

GPA: 3.59

RESEARCH EXPERIENCE

University of Michigan

2014 – Present

Mentor: Dr. Justin C. Kasper

- Analyze ion differential streaming in the Wind Solar Wind Experiment (SWE) Faraday cup data.
- Collaborate on validation of a new three species data product from the Wind/SWE Faraday cups.
- Apply Nyquist's instability criterion to SWE/FC data.

University of Michigan & Southwest Research Institute

2018

Mentor: Dr. Stefano Livi & Dr. Jim Raines

- Collect recalibration data with the *MESSENGER* Fast Imaging Plasma Spectrometer (FIPS).
- Operate high voltage particle accelerator.

Macalester College

2011

Mentor: Dr. Tonnis ter Veldhuis

- Predict phenomenological signatures of the Singlet Scalar extension to the Standard Model.

TEACHING EXPERIENCE

Alterman Tutoring

8/2011 – Present

Multiple Locations

- Tutor and mentor high school and college students in physics and math with a focus on developing individualized learning strategies; methods for self-teaching; and tools for self-advocacy.

Introductory Physics for Life Sciences Lab

5/2014 – 6/2014

University of Michigan, Department of Physics

- Instructor of record for introductory life sciences lab.

Introductory Physics for Engineers Lab

5/2013 – 6/2013

University of Michigan, Department of Physics

- Instructor of record for introductory engineering sciences lab.

Electromagnetic Theory and Intro Physics Teaching Assistant

8/2011 – 4/2012

Macalester College, Department of Physics & Astronomy

- Grade and tutor undergraduate introductory physics and upper level electromagnetism classes.

PUBLICATIONS

1. Alterman, B. L. *et al.* A Comparison of Alpha Particle and Proton Beam Differential Flows in Collisionally Young Solar Wind. *Astrophys. J.* **864**, 112. ISSN: 1538-4357 (Sept. 2018).
2. Klein, K. G. *et al.* Majority of Solar Wind Intervals Support Ion-Driven Instabilities. *Phys. Rev. Lett.* **120**, 205102. ISSN: 1079-7114 (2018).
3. Stevens, M. L. & **Alterman, B. L.** Proton Beams at 1 AU in the Wind Faraday Cups (in prep).

INVITED PRESENTATIONS

1. **Alterman, B. L.** *An Experimentalists Introduction to the Solar Wind* in *SHINE Conf.* (Saint-Sauveur, Quebec, Canada, 2017).
2. **Alterman, B. L.** *Collisions in an Expanding Solar Wind* in *SHINE Conf.* (Saint-Sauveur, Quebec, Canada, 2017).

PRESENTATIONS

1. **Alterman, B. L.** *et al.* *A Deeper Understanding of Stability in the Solar Wind: Applying Nyquist's Instability Criterion to Wind Faraday Cup Data* in *AGU Fall Meet.* (New Orleans, 2017).
2. **Alterman, B. L.** *et al.* *Applying Nyquist's Instability Criterion to in situ Solar Wind Observations* in *SHINE Conf.* (Saint-Sauveur, Quebec, Canada, 2017).
3. Jian, L. K. *et al.* *Electromagnetic Cyclotron Waves at 1 AU: Wind Observation and Wave Dispersion Analysis* in *SHINE Conf.* (Saint-Sauveur, Quebec, Canada, 2017).
4. Klein, K. G. *et al.* *A General Identification of Instabilities in Solar Wind Plasma, and a Particular Application to the WIND Data Set* in *Eur. Geophys. Union* (2017).
5. Klein, K. G. *et al.* *A General Identification of Instabilities in Solar Wind Plasma, and a Particular Application to the WIND Data Set.* in *EGU General Assembly Conference Abstracts* **19** (Apr. 2017), 11005. <http://adsabs.harvard.edu/abs/2017EGUGA..1911005K>.
6. Klein, K. G. *et al.* *Reassessing Solar Wind Stability using Nyquist's Method* in *APS Meeting Abstracts* (Oct. 2017). <http://adsabs.harvard.edu/abs/2017APS..DPPC06003K>.
7. Korreck, K. E. *et al.* *Understanding non-equilibrium collisional and expansion effects in the solar wind with Parker Solar Probe* in *AGU Fall Meet.* (2017). <https://agu.confex.com/agu/fm17/meetingapp.cgi/Paper/207713>.
8. Qudsi, R. A. *et al.* *Using Higher-Order Moments to Quantify Ion-Beam Strength in the Solar Wind* in *SHINE Conf.* (Saint-Sauveur, Quebec, Canada, 2017).

9. Van der Holst, B. *et al.* *A New Global Multi-fluid MHD Model of the Solar Corona* in *AGU Fall Meet.* (New Orleans, 2017).
10. **Alterman, B. L.** *et al.* *Alfvénicity of Ion Drifts at 1AU* in *AGU Fall Meet.* (2016).
11. **Alterman, B. L.** *et al.* *Alfvénicity of Ion Drifts at 1AU* in *SHINE Conf.* (2016).
12. **Alterman, B. L.** *et al.* *Differential Flow: Locally Generated or Coronal Artifact?* in *SHINE Conf.* (Stowe, VT, 2015).
13. **Alterman, B. L.** *et al.* *Differential flow: Locally Generated or Coronal Artifact?* in *AGU Fall Meet.* (San Francisco, CA, 2015). <https://agu.confex.com/agu/fm15/webprogram/Paper64749.html>.
14. **Alterman, B. L.** *et al.* *Differential flow: Locally Generated or Coronal Artifact?* in *Eng. Grad. Symp.* (Ann Arbor, MI, 2015).
15. Hegedus, A. *et al.* *Multi-scale Analysis of DSCOVR Data Using Wavelet Cross Correlation* in *AGU Fall Meet.* (San Francisco, CA, 2015). <https://agu.confex.com/agu/fm15/webprogram/Paper63704.html>.
16. Tracy, P. J. *et al.* *Heavy Ion Temperatures As Observed By ACE/Swics* in *AGU Fall Meet.* (Agu, 2014). <https://agu.confex.com/agu/fm14/webprogram/Paper8760.html>.
17. Whittlesey, P. *et al.* *Testing the Solar Probe Cup, An Instrument Designed to Touch the Sun* in *AGU Fall Meet.* (Agu, San Francisco, CA, 2014), 950. <https://agu.confex.com/agu/fm14/webprogram/Paper25375.html>.

GRANT AWARDS

- Rackham Dean’s Strategic Initiative Grant** **2013**
 – Partially fund **Dare to Dream**, UofM.
- Bezos Aspen School Award** **2007**
 – Fund an interfaith conference about discussing misconceptions across cultural barriers.

HONORS, AWARDS, & FELLOWSHIPS

- Munger Case Competition Winner** **2018**
Munger Graduate Student Residence, University of Michigan
 – Team awarded 1st place
 – Collaboratively develop a plan to build a Diversity Cultural Center at the University
 – See <http://www.rackham.umich.edu/diversity-equity-inclusion/munger-case-competition> for details
- Science Communication Fellow** **2017**
University of Michigan, Museum of Natural History
 – Develop a tabletop kinetic plasma physics demo suitable for all ages.
 – Present demo at the **Scientist Spotlight**.
- Harry Scherman Scholarship** **2010**
National Honor Society **2008**
Bezos Aspen Scholarship **2007**

SERVICE

- Committee for an Inclusive University** **2018 – 2019**
Senate Advisory Committee on University Affairs (SACUA)
 – Collect and summarize unit expectations regarding Diversity, Equity, & Inclusion

- Explore and summarize how these expectations relate to faculty evaluation and reviews
- Recommend best practices to SACUA

DEI Committee Chair

2018 – Present

Graduate and Undergraduate Student Organization (GUSTO)

- Lead GUSTO Diversity, Equity, & Inclusion (DEI) Committee in the Department of Climate and Space Sciences and Engineering at the University of Michigan.
- Coordinate student events targeting DEI.
- Advise faculty committees on DEI activities, especially as related to student involvement and experience within the department.

Services for Students with Disabilities Student Advisory Board

2017 – 2018

University of Michigan

- Provide guidance and feedback to the Office of Services for Students with Disabilities.
- Interview candidates for University of Michigan Associate Vice-President for Student Life and Executive Director of University Health Services.

SHINE Session Organizer

Multiple Locations

- Disentangling Expansion Effects and Collisional Relaxation in the Solar Wind 2017

Rackham Representative, Central Student Government

12/2012 – 1/2015

University of Michigan

- Vice-Chair, Rules Committee 4/2013 - 4/2014
- Vice-Chair, Inclusive Campus Commission 8/2014 - 1/2015

Dare to Dream, UofM

8/2013 – 11/2013

University of Michigan

- Organize & host film screening and panel discussion to raise awareness and build support for male survivors of sexual violence.
- Responsible for all financial, programmatic, marketing, and administrative aspects of the program, including fund raising, booking speakers, and coordinating student organizations and university departments.

OUTREACH

Research Education and Activities for Classroom Teachers (REACT)

7/2018

- Develop grade-level appropriate activity for middle school students to investigate Newton's 3rd Law through rocket design.
- Lead local K-12 educators on a tour of the Climate and Space Sciences and Engineering Facilities.

Scientist Spotlight

3/2017; 4/2017

- Engage University of Michigan Museum of Natural History patrons with a tabletop kinetic plasma physics demo.

Lunch and Lab

1/2016; 3/2017; 10/2017; 9/2018

- Mentor undergraduate engineering students and advise them on connecting with professors, developing research opportunities, and pursuing research projects.

eXplore Engineering Rocket Workshop

6/2015

- Support middle school students in building and testing air pressure rockets to investigate air drag, propulsion, launch angle, and the effects of wing shape on rocket flight.

Middle School Demo Day

3/2013

- Prepare demonstration of electrostatic charges and engage students at the Slauson Middle School in Ann Arbor, MI with this demo.

AFFILIATIONS

American Geophysical Union

2014 – Present

American Physical Society

2014 – Present

PROGRAMMING LANGUAGES

– Python

– LaTeX

– Mathematica

– LabView

DIVERSITY STATEMENT

Growing up in the Boston Public Schools (BPS), diversity was a given and equity & inclusion essential to my education. I was always struck by how these issues only focused on visible or phenotyped aspects of diversity. My senior year, I brought three community leaders together for a panel discussion about one aspect of invisible identity: religion. In an ethnically, socio-economically, and racially diverse public school, we engaged with aspects of our identities that can be essential to our sense of self, yet not necessarily visible to each other. They are also aspects of identity for which there exists a power differential between how the various manifestations (Christian, Jewish, Muslim, Hindu, Sikh, etc.) are legally and culturally empowered.

As a white, Jewish male with learning disabilities in the BPS, diversity, equity, and inclusion have always and necessarily been intersectional. As a peer tutor and working with disabilities services, seeing the how my peers of different backgrounds had or didn't have access to the same resources as I did and engaging with the longterm impact these factors had on my peers education and my own, has given me first hand experience of the ways identity can impact one's power and privilege or lack thereof. These experiences have also taught me the importance of creating space for and supporting all intersectional identities, both those I perceive and those I don't.

As a teacher, tutor, and academic mentor, it is within my power and I therefore consider it my responsibility to create a learning environment that empowers all students to advocate for their needs so that we can collaboratively develop techniques and tools to meet each of their diverse needs. Two key impediments to this goal are (1) student expectations of classroom, mentoring, and learning environments and (2) peer pressure, both overt/explicit and as expressed through unintentional microaggressions. As a teacher and mentor, I have institutionally backed and culturally defined power to set and create these norms. I find it most impactful to do this on day 1 and I start with my syllabi.

Most syllabi I have seen include a statement of the flavor:

If you are registered with Disabilities Services, let me know and I will accommodate you.

Such language sets the expectation that students requiring accommodations are challenging established norms by requesting professors change their behavior, which reinforces the ways in which peer pressure can manifest and push students to not request the resources to which they have a legal right. I attempt to subvert and dissipate this power structure by setting a different expectation. As a graduate student instructor (GSI), I wrote:

I am registered with Services for Students with Disabilities. If you would like to discuss my experience working with them or there is anything I can do to support your education, please let me know.

To maintain authenticity and broaden the ways I create openings for my students, I will alter this to something like

I strive provide a differentiated pedagogical environment that supports each of your educations. If you would like to collaborate on ways we can improve your learning experience, please come speak with me. Many of us have experiences that create unique learning needs. So I make this offer to all students, irrespective of any accommodations the University explicitly provides you.

By setting this expectation and norm, I communicate that all students have access to support and resources. Students can also begin to expect that they have a right to equitable treatment that is conscious of their individual identities and needs. By asking to collaborate with my students, I attempt to teach them that it is their responsibility to speak up for themselves. By responding positively to their requests, I acknowledge that it is my responsibility to support their learning and I attempt to reinforce a positive sense of self-worth. By engaging them in this collaboration, I aim to cultivate an appreciation of the impact we can have together developing a workable solution. Long term, I hope that the skills we develop will empower my students to find solutions even when faced with people who have no regard for their individual needs and unique identities & abilities. At the same time, such collaborations enable me to continually learn more about my students' diverse needs so that I am progressively able to create an ever more equitable and inclusive learning, mentoring, and working environment.