

Sean W. Buechele

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Education:

Clemson University, Clemson SC
Bachelor of Science in Physics
Minor in Mathematical Science
Minor in Engineering
Class of 2018

Nanyang Technological Institute, Singapore
Study Abroad Program
Non-degree granting program Spring
2016

UC Santa Barbara, Santa Barbara CA
2nd Year Ph.D student – Jayich Lab

Research Experience:

University of California, Santa Barbara, Department of Physics

August 2019 – Present, Doctoral Student Researcher

Research under Dr. Andrew Jayich on ion trap projects involving Sr^+ and Ra^+ . Primary implementations include work on creation of a Mølmer–Sørensen quantum logic gate, and isotope shift spectroscopy to constrain physics beyond the standard model.

National Institute of Standards and Technology

June 2018 – July 2019, Research Associate

Researched in the Atomic Spectroscopy Group under Dr. Yuri Ralchenko and Dr. Endre Takacs. Worked on design and implementation of UHV interfaces for spectrometer calibration, in addition to operation of Electron Beam Ion Trap (EBIT) for highly charged ion experiments. Also responsible for operation and development of a TES microcalorimeter array.

Cornell University, Cornell Laboratory for Accelerator-Based Sciences and Education

Summer 2017, Research Experience for Undergraduates

Worked on Cornell High Energy Synchrotron Source (CHESS) under Dr. James Crittenden. Modelled electron cloud buildup in Cornell Electron Storage Ring (CESR) to make predictions and recommendations for operating conditions in upgrades to CHESS in 2018

Clemson University, Department of Physics and Astronomy

May 2016 – May 2017, Undergraduate Student Researcher

Worked under Dr. Joan Marler on locking in diode lasers for applications in trapping of Ca^+ ions to perform low temperature chemistry with coulomb crystals.

Journal Publications:

“Optical mass spectrometry of cold RaOH^+ and RaOCH_3^+ ”

University of California Santa Barbara – Jayich Lab

M. Fan, C.A. Holliman, X. Shi, H. Zhang, M.W. Straus, X. Li, S.W. Buechele, and A.M. Jayich
Physical Review Letters 126, 023002 (2021), [DOI: 10.1103/PhysRevLett.126.023002](https://doi.org/10.1103/PhysRevLett.126.023002)

“Measurements of linear polarization of satellite transitions from Li- and Be- like Ar ions”

(NIST) National Institute of Standards and Technology

A.C. Gall, Dipti, S.W. Buechele, S. Sanders, C. Szabo, R. Silwal, Yu. Ralchenko, and E. Takacs
Journal of Physics B: AMO Physics **53**, 145004 (2020), [DOI: 10.1088/1361-6455/ab8eff](https://doi.org/10.1088/1361-6455/ab8eff)

“Linear polarization of anisotropically excited x-ray lines from the $n=2$ complex in He-like Ar^{16+} ”

(NIST) National Institute of Standards and Technology

Dipti, S.W. Buechele, A.C. Gall, S. Sanders, C.I. Szabo, R. Silwal, E. Takacs, and Yu. Ralchenko
Journal of Physics B: AMO Physics **53**, 115701 (2020), [DOI: 10.1088/1361-6455/ab7d25](https://doi.org/10.1088/1361-6455/ab7d25)

“On Low-Energy Tail Distortions in the Detector Response Function of X-Ray Microcalorimeter Spectrometers”

(NIST) National Institute of Standards and Technology

G. C. O’Neil, P. Szypryt, E. Takacs, J. N. Tan, S. W. Buechele, A. S. Naing, Yu. Ralchenko et al
J Low Temp Phys **199**, 1046–1054 (2020), [DOI: 10.1007/s10909-019-02270-y](https://doi.org/10.1007/s10909-019-02270-y)

“A transition-edge sensor-based x-ray spectrometer for the study of highly charged ions at the National Institute of Standards and Technology electron beam ion trap”

(NIST) National Institute of Standards and Technology

P. Szypryt, G. C. O’Neil, E. Takacs, J. N. Tan, S. W. Buechele, A. S. Naing, Yu. Ralchenko et al
Review of Scientific Instruments **90**, 123107 (2019), [DOI: 10.1063/1.5116717](https://doi.org/10.1063/1.5116717)

“Measurement and modeling of electron-cloud-induced betatron tune shifts at CESRTA”

(CLASSE) Cornell Laboratory for Accelerator-based Sciences and Education

S. Poprocki, S. W. Buechele, J. A. Crittenden, K. Rowan, D. L. Rubin, and J. E. San Soucie
Phys. Rev. Accel. Beams **22**, 081001 (2019), [DOI: 10.1103/PhysRevAccelBeams.22.081001](https://doi.org/10.1103/PhysRevAccelBeams.22.081001)

Mentoring Experience:

University of California, Santa Barbara, Department of Physics

July 2020 – September 2020, Graduate student mentor for the Eddleman Fellowship program

Mentored an undergraduate student on creation of a Mølmer–Sørensen in the platform of trapped ions.

Teaching Experience:

University of California, Santa Barbara, Department of Physics

October 2019 – Present, Teaching Assistant

- Fall 2019 - PH13AH/CS15A under Dr. Andrew Jayich
- Winter 2020 - PH13BH/CS15B under Dr. Everett Lipmann
- Spring 2020 – PH128AL under Dr. Xiao Luo
- Summer A 2020 – PH128AL under Dr. Everett Lipmann
- Summer B 2020 – PH104 under Dr. Brian Willet
- Winter 2021 - PH13BH/CS15B under Dr. Andrew Jayich

Clemson University, Department of Physics and Astronomy

August 2017 – May 2018, Teaching Assistant

- Assisting Dr. Joshua Alper in teaching Advanced Classical Mechanics I and II
- Grading assignments and teaching recitation sessions for both homework and tests

Outreach / Community Involvement:

University of California, Santa Barbara

- GradLife (Member) – Mentoring incoming graduate students and organizing events to ease transition to department.
- Undergraduate Diversity and Inclusion in Physics (Graduate Mentor) – Mentorship of undergraduate physics students with emphasis on inclusion of groups typically underrepresented in the field of physics. Running of department-wide general office hours aimed at the same demographics.

Clemson University

- Society of Physics Students (Member/Safety Officer) – Organization and participation in local high school outreach events, as well as undergraduate projects.
- Solar Eclipse event (Participant) – Helped in running a large-scale community event for the observation of the 2017 solar eclipse. This involved community education, projects for children, and general logistics.

Cornell University

- Physics Bus (Volunteer) – Outreach vehicle filled with small scale experiments aimed for children through the high school level. Responsible for setup, teaching, and community engagement throughout upstate New York.