

# Reginald A. Bain

Physics Instructor, SC Governor's School for Science & Mathematics  
Columbia, SC | [rbain@governors.school](mailto:rbain@governors.school) or [reggiebain@gmail.com](mailto:reggiebain@gmail.com) | (803) 760-6891

## Education

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**Duke University**, Durham, NC | 2012 - 2017

*Ph.D., M.A., Physics, Certificate in College Teaching*

- Thesis: "Probing Quarkonium Production in Jets using Effective Field Theories"
- Adviser: Thomas Mehen

**University of South Carolina**, Columbia, SC | 2008 - 2012

*B.S., Physics & Mathematics, Summa cum laude and with honors from the SC Honors College*

- Thesis: "Carolina Science Outreach: Advocating Scientific Awareness"
- Adviser: Edward Munn Sanchez

## Experience

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**Physics Instructor, South Carolina Governor's School for Science & Mathematics**

Hartsville, SC | 2019 - Present

- Developed new institutional assessment program. Taught college-level physics courses at boarding school for gifted juniors/seniors. Mentored students in communicating scientific research.
- Designed courses and lab experiments using contemporary education research, incorporating and developing innovative educational technologies and resources.
- Courses — PHY 161-162: General Physics I, II (Dual-Enrolled), PHY 201-202: AP Physics C with lab, PHY 151-152: (AP Physics 1) with lab, INDS Independent Study, Mathematical Physics (Spring 21), PHY 101-102: College-level introductory physics course with lab, RES 401: Teaching/mentoring students in communicating scientific research

**Instructional Assistant Professor of Physics, University of Houston**

Houston, TX | 2017 - 2019

- Research into improving student outcomes by analyzing student performance data. Supervised numerous teaching assistants and managed tutoring center.
- Taught large-enrollment (500+ students) courses, piloted new "inquiry-based" course and designed innovative online resources/curricula. Courses — PHY 1301: Inquiry-based algebra-based mechanics course, PHY 1301: Large-enrollment, lecture-based, algebra-based mechanics course

**Graduate Teaching Fellow & Graduate Researcher, Duke University**

Durham, NC | 2012 - 2017

- Advanced models of quark interactions in proton collisions at the Large Hadron Collider (LHC). Identified problems in how the industry standard Monte Carlo modeled how quarks combine to form exotic heavy particles.

- Used mathematical techniques of Quantum Field Theory to devise improved method for modeling quarkonia production via Monte Carlo. Developed theoretical techniques for using the geometry of clusters of high energy particles to identify their quark origin.
- Served as recitation and lab instructor for multiple introductory physics courses. Courses — PHY 151: Calculus-based course for engineering majors, PHY 161: Team-based-learning style introductory course for physics majors, PHY 141/142: algebra-based course for life-sciences majors.

## **Mentoring, Service & Outreach**

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### **SC Governor's School for Science & Mathematics** | 2019 - Present

#### *Assessment Committee*

- Created new institutional assessment program. Developed rubrics, student reflection prompts, student learning objectives, and piloted new student portfolio system for institutional assessment.

#### *Faculty Senate*

- Served as physics department representative and secretary on faculty senate.

#### *Application Reviewer*

- Reviewed and scored applications as part of admissions process to GSSM.

#### *Semi-Finalist Day Interviewer*

- Interviewed potential students for admission to GSSM.

#### *Off-Campus Trip Supervisor*

- Facilitated students taking 3-week glider piloting course from 2019-2025

### **University of Houston, Houston, TX** | 2017 - 2019

#### *Coordinator of UH Physics Learning Center*

- Managed free drop-in physics tutoring center staffed by graduate students

#### *Guest Facilitator, STEM Teaching Equity Project (STEP)*

- Inquiry-based physics course for Houston-area K-12 physics teachers

#### *Faculty Advisor, Communicating Science Club at UH*

- Club raises funds and organizes annual ComSciCon-Houston event at Rice/UH

### **ComSciCon-Triangle Workshop, Raleigh-Durham, NC** | 2015 - 2017

#### *Co-founder & Organizer*

- Organized science communication workshops for graduate students from NC universities in Research Triangle area of North Carolina.

### **ComSciCon-National Workshop, Cambridge, MA** | 2014 - 2017

#### *Workshop Organizer*

- Organized science communication workshops for STEM graduate students and post-docs from universities across the country.

### **Carolina Science Outreach, Columbia, SC** | 2010 - 2012

#### *Co-founder & Director*

- Science outreach organization that gave interactive science outreach presentations to thousands of K-12 students across South Carolina.

## Professional Development

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### Preparing Future Faculty Fellow, Duke University | 2016 - 2017

- Completed year-long program for graduate students to learn about the workings of a variety of different types of academic institutions through an array of panels, workshops, and projects.
- Worked with Physics Education Research group at NC State University. Attended SCALE-UP classes and group meetings.
- *Mentor*: Robert Beichner, Distinguished Professor Emeritus in Physics at NC State University

### Duke Emerging Leaders Institute, Duke University | 2014-2017

- Five-week program emphasizing project management, communication skills, and interdisciplinary teamwork.
- Surveyed 300+ graduate students as part of project entitled "The Culture of Academia: Realities of Pursuing Non-Academic vs. Academic Careers."

### Duke Certificate in College Teaching Program | 2015 -2017

- Completed coursework on pedagogy, teaching diverse audiences, and effective design practices.

## Honors & Awards

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### National Honors & Awards

- Physics Teacher Education Coalition (PhysTEC) Fellow | 2018 - 2019
- DOE Office of Science Graduate Student Research Fellowship (Declined) | 2017
- National Science Foundation Graduate Research Fellowship | 2012
- Barry M. Goldwater Scholarship | 2011
- Phi Beta Kappa | 2011

### Duke University

- Preparing Future Faculty Fellow | 2016 - 2017
- Mary Creason Award for Excellence in Undergraduate Teaching | 2013
- Duke Townes-Perkin-Elmer Graduate Fellowship | 2012

### University of South Carolina

- Nina and Frank Avignone Physics Award | 2012
- Jeong S. Yang Award for Excellence in Mathematics | 2012
- College of Arts and Sciences Rising Senior Award in Physics | 2011
- Polston Family Award for Excellence in Undergraduate Mathematics | 2011
- Carolina Leadership Scholar | 2011
- Olin D. Johnston Memorial Carolina Scholarship | 2008

## Publications

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- O'Keeffe K, Bain R. 2018. Comscicon-triangle: regional science communication training for graduate students † . J. Microbiol. Biol. Educ. 19(1): doi:10.1128/jmbe.v19i1.1420

- R. Bain, L. Dai, A. Leibovich, Y. Makris, and T. Mehen, “NRQCD Confronts LHCb Data on Quarkonium Production in Jets”, *Phys. Rev. Lett.* 119, 032002, [arXiv:hep-ph/1702.05525].
- R. Bain, Y. Makris, and T. Mehen, “Transverse Dependent Fragmenting Jet Functions with Applications to Quarkonium Production,” JHEP 11 (2016) 144, [arXiv:hep-ph/1610.06508].
- R. Bain, L. Dai, A. Hornig, A. Leibovich, Y. Makris, and T. Mehen, “Analytic and Monte Carlo Studies of Jets with Heavy Mesons and Quarkonia,” JHEP 06 (2016) 121, [arXiv:hep-ph/1603.06981].

## Conferences

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- AAPT Winter Meeting, Houston, TX, Poster | January, 2019
- AAPT Summer Meeting, Washington, DC, Poster | August, 2018
- PhysTEC Workshop, Washington, DC | February, 2018
- SCET 2017, Wayne State University, Detroit, MI, Speaker | March, 2017
- Jets & Heavy Flavor Workshop, Santa Fe, NM, Speaker | February 2017
- LANL, T-2 Nuclear Physics Seminar, Los Alamos, NM, Invited Speaker — December 2016
- Physics Colloquium at University of South Carolina Dept. of Physics & Astronomy, Columbia, SC, Invited Speaker — November 2016
- SCET 2016, DESY, Hamburg, Germany, Speaker — March 2016
- Jets and Heavy Flavor Workshop, Santa Fe, NM, Speaker — January 2016
- Discovery Day, University of South Carolina, Columbia, SC, Poster & Talk — April 2012
- US ATLAS Workshop, Boston University, Boston, MA, Poster — August 2011
- US ATLAS Workshop, New York University, New York, NY, Poster — August 2009s

## References

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1. Dr. Gordon Brown | SC Governor’s School for Science & Mathematics | 401 Railroad Ave. Hartsville, SC 29550 | *Phone:* (843) 383-3901 x4028 | *Email:* [gbrown@governors.school](mailto:gbrown@governors.school)
2. Dr. Stephen Kaczowski | SC Governor’s School for Science & Mathematics | 401 Railroad Ave. Hartsville, SC 29550 | *Phone:* (843) 383-3901 x3980 | *Email:* [kaczowski@governors.school](mailto:kaczowski@governors.school)
3. Mr. Taylor Belcher | SC Governor’s School for Science & Mathematics | 401 Railroad Ave. Hartsville, SC 29550 | *Phone:* (843) 383-3901 x3969 | *Email:* [tbelcher@governors.school](mailto:tbelcher@governors.school)
4. Dr. Arya Roy | Duke University, Dept. of Physics Physics Bldg., Science Dr. Campus Box 90305 Durham, NC 27708 | *Phone:* (919) 564-5175 | *Email:* [arya.roy@duke.edu](mailto:arya.roy@duke.edu)