

# Dr. Bárbara Cruvinel Santiago, Ph.D.

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<b>Education</b>	<b>Columbia University</b> – New York, NY, USA Aug 2018 – Jul 2023 Ph.D. in Physics (Jul 2023); M.Phil in Physics (May 2021); M.A. in Physics (May 2020) <b>Yale University</b> – New Haven, CT, USA Aug 2013 – May 2017 B.S. in Physics (Intensive Track) <b>Colégio Objetivo</b> (High School) – Santos, SP, Brazil Jan 2010 – Dec 2012
<b>Research Experience</b>	<b>Graduate Research at Columbia (Schiminovich Group)</b> – New York, NY, USA Jan 2019 – Jul 2023 Work in Prof. Schiminovich group on the development of spectrographs for the study of intergalactic and circumgalactic media emission, and on the analysis of observational data. <b>Post-Bacc Research at MIT-LIGO (Mavalvala Group)</b> – Cambridge, MA, USA Jul 2017 – Jun 2018 Work in Prof. Nergis Mavalvala's LIGO group on a optomechanical light squeezing experiment. Focus on noise characterization and on the development of a light intensity stabilization servo. <b>Undergraduate Research at Yale (DeMille Group)</b> – New Haven, CT, USA Jun 2015 – May 2017 Work in Prof. David DeMille's group on the development and upgrade of hardware for his experiments. <b>Undergraduate Research at CERN (Demers Group)</b> – Meyrin, Switzerland Jun 2014 – Aug 2014 Work in Prof. Sarah Demers' group at the ATLAS Experiment in the search for W,Z associated Higgs production.
<b>Most Important Honors and Awards</b>	<b>Five Sigma Physicist Award</b> – USA 2021 American Physical Society Government Affairs award for outstanding advocacy. <b>Physicists Coalition's Next-Generation Fellowship</b> – USA 2020 One of 4 fellows in the year-long program sponsored by the American Physical Society and the Princeton Science & Global Security Program to train early-career scientists in nuclear threat reduction policymaking. <b>Future Investigators in NASA Earth and Space Science and Technology Fellowship</b> – USA 2019 NASA's 3-year graduate student fellowship awarded to student-designed research projects that contribute to NASA's exploration goals; formerly known as NESSF. <b>Yale College Dean's Research Fellowship in the Sciences</b> – New Haven, USA 2016 and 2015 Summer award to do research at Yale and start senior thesis. <b>Pierson College Richter Summer Fellowship</b> – New Haven, USA 2016 and 2015 Summer award to do research at Yale and start senior thesis. <b>Tetelman Fellowship for International Research in the Sciences</b> – New Haven, USA 2014 Summer award to do research at CERN. <b>Science, Technology and Research Scholars Program I (STARS I)</b> – New Haven, USA 2014 Selective mentoring program for minority students interested in STEM at Yale in their freshman year. <b>Fundação Estudar Scholarship</b> – São Paulo, Brazil 2013 Merit-based scholarship awarded to 27 out of 11,000 applicants based on academic excellence and students' potential to lead and leave a positive legacy in Brazil. <b>25th International Young Physicists' Tournament (IYPT), Bronze Medal</b> – Germany 2012 IYPT is considered the Physics World Cup for high school students. Teams of 5 students selected in national competitions in each country work on open-ended problems and debate about them. <b>24th International Young Physicists' Tournament (IYPT), 15th place</b> – Iran 2011 IYPT is considered the Physics World Cup for high school students. Teams of 5 students selected in national competitions in each country work on open-ended problems and debate about them.
<b>Skills</b>	<i>Programming:</i> <b>Matlab, Mathematica, Python, C/C++ and HTML.</b> <i>Languages:</i> <b>Portuguese</b> (native), <b>English</b> (fluent), <b>German</b> (intermediate) and <b>Spanish</b> (read).
<b>Congressional Action</b>	<b>APS-led Congressional Action, Physicists Coalition Delegation Member</b> Summer 2021 Met with congressional offices to advocate for "no first use" of nuclear weapons. <b>NAGPS Legislative Action Days (LAD), Columbia Delegation Member</b> Mar 2020 I was a part of Columbia's delegation to NAGPS's LAD and met with HR and Senate staff about issues and bills that affect grad students (online because of COVID-19).

	<b>Lobbying against ICE removal of SEVP exemption, <i>Initiative Organizer</i></b> Jul 2020 After ICE removed the exemption permitting international students to maintain their status taking online courses, I led a group of physics students who met (virtually) with House Reps. and congressional staff.	
<b>Leadership Positions</b>	<b>SU(5) Peer Mentoring, <i>Founding Member &amp; Mentor/Facilitator</i></b> 2020-Present SU(5) provides a network and a mentor to incoming astronomy and physics graduate students nationwide. <b>Columbia Physics Grad Council, <i>President &amp; Diversity Liaison</i></b> – New York, USA 2019 – 2021 Served as President (2020-2021) and as Climate and Diversity Liaison (2019-2020). Addressed students' quality of life and academic issues alongside the dept.'s chair and committees, and other student groups. <b>Columbia Spectra, <i>Graduate Coordinator</i></b> – New York, USA 2018 – 2020 Formerly the Columbia Society for Women in Physics. I coordinated events targeting current and prospective grad students, and advised female and underrepresented undergrads in physics. <b>Yale Physics Climate and Diversity Committee, <i>Undergrad Rep.</i></b> – New Haven, USA 2015 – 2017 Represented the interest of Yale physics undergrads with respect to the climate of the department. <b>Yale Women in Physics, <i>Co-President &amp; Co-Coordinator</i></b> – New Haven, USA 2014 – 2016 Served as President (2015-2016) and as Conference Co-Coordinator (2014-2015). Responsible for organizing a national conference, panels and social events for the Yale physics community. <b>Brazil Club at Yale, <i>President &amp; Vice-President</i></b> – New Haven, USA 2014 – 2016 Served as President (2015-2016) and Vice-President (2014-2015). Responsible for organizing social events, talks and meals for people interested in Brazil at Yale. <b>Yale Admissions Office, <i>Science Tour Guide</i></b> – New Haven, USA Summer 2015 Worked part-time as a tour guide of Yale's science facilities.	
<b>Extra Coursework and Summer Schools</b>	<b>Princeton School on Science and Global Security</b> – Princeton, NJ, USA Oct 2022 Selective 4-days school on nuclear security issues for early-career scientists. <b>George Washington University Nuclear Security Boot Camp</b> – Online Jun 2020 Selective week-long course on nuclear security taught by science/policy experts and policymakers. <b>Dunlap Institute Introduction to Astronomical Instrumentation</b> – Toronto, Canada Aug 2016 Selective week-long theoretical/experimental summer school at the Dunlap Institute for Astronomy and Astrophysics at the University of Toronto for college seniors and graduate students. <b>Course of General Astronomy</b> – Brazil Nov 2011 – May 2012 Course for the top 120 in the Brazilian Astronomy Olympiad competing to represent Brazil internationally. <b>IV Advanced School of Nuclear Energy (EAEN)</b> – São Paulo, Brazil Jul 2011 Selective week-long school for high schoolers at the Institute for Nuclear Energy Research at USP.	
<b>Teaching, Mentoring and Outreach</b>	<b>Introductory Physics Recitations and Labs, <i>TA</i></b> – Columbia University, New York, USA 2018-2020 Responsible for teaching introductory physics recitations and labs to over 140 pre-medical and engineering undergrads over 2 years. Courses: UN1202, UN1401, UN1292, UN1291. <b>National Selection Tournament of US IYPT, <i>Juror</i></b> – New Haven, USA Spring 2018 Judged selection of high school team to represent the US at the International Young Physicists' Tournament. <b>New Haven Science Fair, <i>Mentor</i></b> – New Haven, USA Spring 2017 Mentored a New Haven public school 9th grader on a thermodynamics project. She won 2nd place in the entire fair and an award for science communication. <b>Yale College Dean's Office, <i>STARS Peer Mentor</i></b> – New Haven, USA 2016 – 2017 Worked as Peer Mentor for incoming minority students interested in pursuing STEM majors at Yale who participate in the Science, Technology and Research Scholars Program I. <b>Yale Girls Science Investigations, <i>Volunteer</i></b> – New Haven, USA Fall 2016 Volunteered to help GSI, which brings elementary school girls to Yale to do fun experiments for a day. <b>Yale Office of International Students and Scholars, <i>Peer Liaison</i></b> – New Haven, USA 2015 – 2016 Worked as a Peer Liaison to help incoming international freshmen adjusting to the Yale environment. <b>Yale Center for Language Studies, <i>Portuguese Tutor</i></b> – New Haven, USA Mar 2015 – Apr 2017 Worked as a tutor for Yale students studying Portuguese language. <b>Splash at Yale, <i>Teacher</i></b> – New Haven, USA Spring 2015 Co-taught the course <i>The Physics of Interstellar</i> for high school students. <b>Brazilian Student Council on Undergraduate Education, <i>Mentor</i></b> – Brazil 2014 – 2015 Mentored 3 Brazilian high school students applying to American colleges.	

**Yale Department of Spanish and Portuguese, Portuguese Grader** – New Haven, USA    2013 – 2014  
Worked as a grader of homework assigned in Portuguese classes.

**Scientific Publications**

N. Melso, D. Schiminovich, B. Smiley and H. R. Ong, B. Cruvinel Santiago, M. Sitaram, I. Cevallos Aleman, S. Graber, M. Murillo, M. Rosenthal, and I. Stelea. *The Circumgalactic H $\alpha$  Spectrograph (CH $\alpha$ S) I. Design, Engineering, and Early Commissioning*. Astrophysical Journal (2022).

**Conferences and Presentations**

**Princeton School on Science and Global Security**, Princeton, NJ, USA, Oct. 2022, *Oral Presentation*.  
B. Cruvinel Santiago, *Brazil Shouldn't Let Bolsonaro Get in the Way of the Ban Treaty*.  
**EstroGênia: Meninas na Ciência** – Tecnologia Educacional (Grupo Positivo), Online, Mar. 2021, *Invited Panelist*, Panel: *How Schools Should Promote STEM Education*.  
**I Congresso Nacional de Inovação e Popularização da Ciência** – Federal University of Minas Gerais (UFMG), Online, Oct. 2020, *Invited Panelist*, Panel: *Science, Innovation and Market after COVID-19*.  
**235<sup>th</sup> American Astronomical Society Meeting** – Honolulu, HI, USA, Jan. 2020, *Poster Presentation*.  
B. Cruvinel Santiago, N. Melso, H. R. Ong, B. Smiley, M. Rosenthal, M. Murillo, S. Graber, and D. Schiminovich, *Circumgalactic H-alpha Spectrograph: Initial Results from the First Engineering Runs*.  
**MIT Physics Exploration Day** – Cambridge, MA, USA, Apr. 2018, *Poster Presentation*. B. Cruvinel Santiago, and I. Phinney, *Overview of Advanced LIGO and future methods of noise reduction*.  
**Scientista Symposium** – New York, NY, USA, Apr. 2017, *Poster Presentation*. B. Cruvinel Santiago, and D. DeMille, *Evaluating and Upgrading a Fast Compact Laser Shutter Prototype*.  
**Pierson College Mellon Forum at Yale** – New Haven, CT, USA, Feb. 2017, *Oral Presentation*. B. Cruvinel Santiago, *Development of Hardware for Atomic Physics Experiments*.  
**APS Conference for Undergraduate Women in Physics (CUWiP) at Yale** – New Haven, CT, USA, Jan. 2015, *Conference Co-Coordinator*.

**Other Honors and Awards**

**Michele Dufault Memorial Scholarship for Yale Women in STEM** – New Haven, USA    2016  
Academic year scholarship awarded to selected women pursuing STEM majors at Yale.  
**Physics Olympiad of the State of São Paulo 2012 (OPF)**, *Bronze Medal* – Brazil    2012  
OPF is a state-level physics competition for São Paulo high school students.  
**3rd Brazilian Linguistics Olympiad (OBL)**, *Honorable Mention* – Brazil    2012  
OBL is a national linguistics competition for Brazilian high school students.  
**Rio Leadership Institute (ILRIO) Prep Program**, *Mentee* – Brazil    2012  
Mentoring program that selects 30 out of ~1000 Brazilian high school students based on academic merit.  
**IYPT Brasil 2012**, *Silver Medal, Selected for national delegation* – Brazil    2012  
National competition that selects 5 high school students to go to represent Brazil at the IYPT.  
**XV Brazilian Olympiad on Astronomy and Astronautics (OBA)**, *Gold Medal* – Brazil    2012  
OBA is a national astronomy competition for Brazilian middle and high school students.  
**Regional Tournament of Exact Sciences (TEX)**, *1st place* – Santos, Brazil    2012  
TEX is a competition on physics, chemistry and math for students in the Baixada Santista region.  
**IYPT Brasil 2011**, *Silver Medal, Selected for national delegation* – Brazil    2011  
National competition that selects 5 high school students to go to represent Brazil at the IYPT.  
**XIV Brazilian Olympiad on Astronomy and Astronautics (OBA)**, *Silver Medal* – Brazil    2011  
OBA is a national astronomy competition for Brazilian middle and high school students.  
**Physics Olympiad of the State of São Paulo 2012 (OPF)**, *Honorable Mention* – Brazil    2010  
OPF is a state-level physics competition for São Paulo high school students.  
**IYPT Brasil 2010**, *Bronze Medal* – Brazil    2010  
National competition that selects 5 high school students to go to represent Brazil at the IYPT.  
**XII Brazilian Olympiad on Astronomy and Astronautics (OBA)**, *Silver Medal* – Brazil    2009  
OBA is a national astronomy competition for Brazilian middle and high school students.  
**XI Brazilian Olympiad on Astronomy and Astronautics (OBA)**, *Silver Medal* – Brazil    2008  
OBA is a national astronomy competition for Brazilian middle and high school students.  
**Objetivo Scholarship Exam**, *Full-Ride Scholarship* – Brazil    2008  
Merit-based scholarship for 5 years of school at Colégio Objetivo.

## Op-Eds and Articles

- B. Cruvinel Santiago, *Why Brazil shouldn't let Bolsonaro stand in the way of ratifying the nuclear ban treaty*, Bulletin of the Atomic Scientists, April 2022.
- B. Cruvinel Santiago, *A female Ph.D. student's cautionary tale and the need for peer mentorship*, Women in Astronomy, Summer 2020.
- B. Cruvinel Santiago, *Undergraduate Profile Katie Melbourne (SY '19): From Yale to NASA*, Yale Scientific Magazine, Spring 2017.
- B. Cruvinel Santiago, *Caro fantasma do preconceito inconsciente... (Dear ghost of implicit bias...)*, Accent (The Undergraduate Multilingual Magazine at Yale), Fall 2016.
- B. Cruvinel Santiago, *Em trânsito: navegando entre dois mundos (In Transit: Navigating Between Two Worlds)*, Accent (The Undergraduate Multilingual Magazine at Yale), Spring 2016.
- B. Cruvinel Santiago, *Agressividade infundada: o novo vício do eleitor brasileiro (Non-sense aggression: the new addiction of the Brazilian voter)*, Accent (The Undergraduate Multilingual Magazine at Yale), Fall 2014.
- B. Cruvinel Santiago, *O Brasil e o império da ciência (Brazil and the science empire)*, Accent (The Undergraduate Multilingual Magazine at Yale), Spring 2014.