

Andrew Oakleigh Nelson

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PROFESSIONAL OBJECTIVE

To study and discover solutions to major unsolved physics issues in magnetic confinement fusion. To pursue excellence in university-level teaching and mentorship to prepare the next generation of diverse physicists.

EDUCATION

- Ph.D. – Astrophysics – Princeton University** 2016 – 2021
Thesis: Comprehensive Dynamic Analysis of the H-mode Pedestal in DIII-D
- M.A. – Plasma Physics – Princeton University** 2016 – 2018
Focus in experimental magnetic confinement fusion
- B.Sc. – Engineering Physics – University of Colorado Boulder** 2012 – 2016
Minors: Applied Mathematics, Leadership Studies

RESEARCH EXPERIENCE

- Associate Research Scientist – Columbia University** 2022 – present
Project lead for initial implementation of advanced negative triangularly plasmas on MAST-U (United Kingdom); Design, optimization and development of negative triangularity control schemes on DIII-D (San Diego, CA); Modeling and assessment of vertical stability control for SPARC (Boston, MA); Fusion power plant design for negative triangularity and highly radiative reactor scenarios; Development of automated kinetic equilibria reconstructions for tokamaks; Analysis and oversight of international non-ELM database; Economic assessment of pilot plant reactors
- Postdoctoral Research Fellow – Columbia University** 2021 – 2022
Project lead for US Joint Research Taskforce on multi-machine 0-D non-ELM database; Assessment of vertical and edge stability for negative triangularly experiments and reactor designs; Design modeling of vertical stability and startup for SPARC
- Graduate Researcher – Princeton University and PPPL** 2016 – 2021
Experimental and modeling studies of the plasma edge and core on DIII-D; Development of various new automated routines for edge modeling, internal profile fitting, kinetic equilibrium reconstruction and neutral beam penetration on DIII-D; Study of fast vertical motion and microturbulence on DIII-D and KSTAR (Korea); Design and implementation of advanced electron cyclotron emission diagnostic techniques on DIII-D; Experimental support for machine learning database studies
- Undergraduate Researcher – University of Colorado Boulder** 2012 – 2016
Honors thesis regarding the design and construction of cryogenic test stand for dusty and space plasmas (IMPACT - Boulder, CO); Experimental and modeling work on fast ignition in laser-based inertial confinement fusion (Technische Universität Darmstadt, Germany); Experimental and modeling work in terahertz metrology (NIST - Boulder, CO)

TEACHING AND MENTORING EXPERIENCE

- Research and Academic Mentor – Columbia University** 2021 – present
Direct research advisor for three undergraduate students and one graduate student; Founder of a weekly graduate-level seminar course on plasma physics; Guest lecturer for an introductory plasma physics course; Teaching assistant for reactor design course held jointly with Columbia and MIT

Research and Academic Mentor – Princeton University	2019 – 2022
<i>Direct research advisor for three undergraduate students; Direct academic mentor for “PreDoc” Graduate Preparation Program; Guest lecturer for plasma physics seminar and introductory fusion courses; Teaching assistant for one undergraduate lecture course and one graduate lab course; Teaching fellow with the Princeton Writing Center and McGraw Center for Teaching and Learning</i>	
Private Tutor – Undergraduate Physics and Mathematics	2014 – 2021
<i>1 – 3 hr/week private instruction in undergraduate physics and mathematics</i>	

LEADERSHIP AND OUTREACH

Principle Investigator – ORFEAS Student Fusion Design Contest	2022
<i>Led a group of eight graduate students in a research contest, winning the maximum prize of \$20k</i>	
Ally – APS Division of Plasma Physics (DPP)	2022 – present
<i>Trained and active resource for diversity, equity and inclusion within US physics communities</i>	
Chair – APS-DPP Student Day	2021 – present
<i>Responsible for a student-oriented mini-conference for at each national APS-DPP convention</i>	
Chair – APS-DPP CONNECT Committee	2020 – present
<i>National organization to address the concerns of students and early career plasma scientists</i>	
Board of Directions – Fusion EP Seminar Series	2021 – 2022
<i>US contact for the international student-led plasma physics seminar series</i>	
Founder + Chair – Plasma Graduate Student Committee, Princeton University	2019 – 2021
<i>Established a committee to amplify student voices and support development of the graduate program</i>	
Organized graduate curriculum reform, Princeton University	2019 – 2021
<i>Led a student effort to dramatically reform a graduate-level plasma diagnostics course</i>	
Graduate representative – PPPL APS-IDEA Team	2020
<i>Communicated graduate student concerns and ideas at national outreach events</i>	
President – Princeton Plasma Student Leadership	2018 – 2019
<i>Bridge between graduate students and faculty and program management</i>	
Volunteer – Princeton Plasma Physics Laboratory	2016 – 2021
<i>PPPL Lab tour guide; frequent volunteer at PPPL-led science education and outreach events</i>	
President – Engineers Without Borders, University of Colorado Boulder	2014 – 2015
<i>Oversaw three international undergraduate engineering projects</i>	

SELECTED AWARDS

- 2019 — Best Poster Award at IIS-2019 in Daejeon, South Korea
- 2018 — US Burning Plasma Association International ITER School Scholar
- 2016 — CU Boulder Outstanding Graduate of the College of Engineering and Applied Science
- 2016 — CU Boulder Engineering Physics Distinguished Graduate
- 2016 — CU Boulder Engineering Physics Distinguished Graduate for Research
- 2016 — Hertz Foundation Scholarship Finalist
- 2015 — Astronaut Scholarship Foundation Scholar

PUBLICATIONS

See attached for an assorted list of publications, or visit [Google Scholar](#) or [ORCID](#).