



Physics Department

Dear SUNY Cortland Colleagues,

Following my promotion to Associate Professor, which became official as of September 1, I am seeking continuing appointment to the faculty at SUNY Cortland. The portfolio presented here is effectively the same as that provided for my promotion review last year, but with a few minor additions. In the following I describe the most important developments since my last review and provide a few concluding thoughts.

Foremost among my priorities in my work here is the development of high-quality courses and experiences for students. Along these lines I am happy to say that I am currently mentoring two of our bright and energetic women physics students, Olivia Wilburn and Victoria Kilfeather, in independent studies. Olivia's project is an assessment of the costs and benefits of switching to various alternate energy sources at SUNY Cortland's Camp Huntington, a project that emerged out of conversations in my fall 2021 *Energy & Sustainability* course. Our goal is to present this work at Transformations and, more importantly, to create a white paper that we can share with the College to aid in its facilities planning. Victoria's project is a continuation of my coupled-pendula experiment that began in the pre-pandemic years, with the goal of acquiring data that will allow me to proceed with a publication involving five student and former student coauthors. An altogether new experience for me is a recent request to mentor a student for his honor's thesis. Following a rough semester in PHY 105 last fall, I conducted a number of interviews with students to learn more about their perspectives, experiences, and study habits. One of these students, Adam Aldrich, proposed the idea of developing a set of new curricular materials to be used through programs through The Learning Center, and which would serve as the basis for his honor's project. We are aiming to develop new material this spring and summer for implementation next fall.

Another significant development is the WEN-D wind tunnel that Sean Nolan and I built last year, with support from our excellent technician, Zachary Sedor. Sean and I applied for a faculty development grant through the Provost's office and were awarded \$500 for materials and measurement devices. I completed construction of the measurement systems last April, which allowed me to use the wind tunnel as a capstone experience in my spring PHY 357 course. I was overwhelmed by the students' enthusiasm for wind tunnel experiments and delighted when they courageously accepted my challenge of presenting our work to the College. I am proud of the presentation they gave during an open seminar on May 7, in which students discussed their research in a group presentation. The wind tunnel will again play a central role in my PHY 357 course this spring, and I am also recruiting students who are interested in aerodynamics to work on independent research projects using the wind tunnel.

Research is progressing well, with my only problem being keeping a limit on the number of new projects. Three manuscripts are in active development, one being a continuation of my 2021 orbital analysis paper which will be called *Rendezvous Revisited*, another being the aforementioned paper with students on the coupled pendula experiment, and the last being a project with colleagues from the Economics Department that examines the efficacy of a range of government intervention measures to curb the COVID pandemic. My work with MIT for the phase contrast imaging (PCI) diagnostic on the Wendelstein 7-X stellarator is in full-swing and our current DOE grant runs through 2024. I spent a month in Germany last summer helping to prepare the system for operation, and we are excited to continue with experiments at the end of the year or early in 2023 (depending on their schedule for finalizing the machine upgrades). Development of my Taylor-Couette experiment is in progress and I am excited at the prospect of getting that running this year. And while our little wind tunnel is not a glorious machine, I believe it capable of doing good work that could be published in an education-focused journal and am looking forward to that prospect.

Service is the embodiment of our ideals of democracy and scholarly debate, which are uniquely exhilarating when viewed from the center. In my new role as Chair of the Educational Policy Committee I am aiming to continue the productive, respectful, and collaborative enterprise that I experienced under Chris Widdall's leadership. Since taking the reins, I have moved forward a major piece of policy change, modifications to the AGT processes and procedures that was prompted by the SGA, which was approved in Faculty Senate today. My goal is to advance at least two more items to the Faculty Senate in the spring semester. I enjoy organizing efforts like this and have discovered that I take a keen interest in understanding the intricacies of our policies and procedures. It is exciting to be at the forefront of a college-wide committee dedicated to perfecting our role and function. Within the Physics Department, I am proud to have helped move forward a slew of new curricular proposals this year and am excited at the prospect of seeing changes that will make our courses more efficient and our programs more impactful.

We seem to be at a difficult moment in education, caught between decreasing enrollment and the rise of things like Chegg which have disastrous outcomes for student learning. These are intensely complex challenges, with no easy answers and solutions that certainly require hard work and creative thinking. We must improve recruitment and retention, and should take a serious look at everything from rebuilding our websites to developing programs that are responsive to contemporary interests. On the subjects of student engagement and performance, I am convinced only that there are no silver bullets and that we need to approach these things with the hard honesty and exacting rigor of educators who want their students to leave our halls as inspired, capable individuals. Toward these ends, I have taken a deep dive into some of the trends and patterns in our introductory physics courses, which has confirmed to myself that the problems are real and beyond the power of any lone individual to fix. The solutions to these challenges are anything but obvious, primarily because at the center of this is the ages-old issue that we and they are separated by a generation and a different way of being – we do not fully understand them and success will require us, it seems, to acknowledge our ignorance, discard ways that do not work, and invent ones that do. I am convinced that the only way through these challenges is to share our experiences and observations as we step toward developing new ideas and perhaps even new methods of education.

In all that I have done here, whether it be cleaning the cabinets of our advanced lab room of sixty years of accumulated craft, editing manuscripts deep into the night, crafting and revising program proposals, consulting with colleagues across campus about the intent of educational policies, or constructing a wind tunnel from plywood and bicycle spokes, I have embraced the simple truth that the path to excellence is grounded in a view of life that finds joy in hard work and pride in a quality product. I have very much enjoyed the path thus far and look forward to the possibility of many more years of making dust, working late into the night, and wordsmithing our way ever toward perfection.

Sincerely,



Eric Edlund
Associate Professor of Physics
SUNY Cortland

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