

Professional Master of Science in Physics

Online Information Session for Boeing
Employees

June 15, 2021

UW Physics Department

UW Professional & Continuing Education

Website: <http://www.physicsmasters.uw.edu>

Today's info session

- Professor Jeffrey Wilkes, *UW Department of Physics*, emsp@uw.edu

Special thanks to

- Jim Grossnickle, *Boeing Research and Technology*;
... and the Boeing Company

Further information is available on our website,
www.physicsmasters.uw.edu

UW Professional MS in Physics Program

Agenda

- The Professional MS in Physics (PMSP) degree program at UW
- PMSP Admission and Degree Requirements
- Partnership between UW Physics and UW Professional & Continuing Education (PCE)
- Questions & Discussion

UW Physics Department

- Offers BS, Professional MS, and PhD programs
 - But there is no full-time/daytime MS program
- Faculty
 - UW Physics faculty recognized internationally as leaders in theoretical and experimental research
 - Two Nobel prize winners (H. Dehmelt, D. Thouless)
 - Students can participate in leading-edge research conducted by faculty, and learn about the latest scientific discoveries

MS-Physics Program (MSP)

- Started in 1970s – program upgraded in 2009
 - Originally most students were Boeing employees
 - Now, students come from many sources:
 - Employees of regional high-tech firms
 - High school teachers
 - Military personnel
 - Recent BS graduates
- Designed for working professionals
 - All evening classes
 - Majority of students enroll in one course per quarter
 - Typically 2-3 years to complete degree program

Designed as terminal MS degree

- Growing demand for Professional Science Master's degrees in STEM fields
 - Employers (industry, R&D labs) recognize value
 - Separate from Physics PhD program
 - Not designed as preparation for PhD studies
 - However, some MSP alumni have gone on to PhD programs at UW and elsewhere
 - All courses taught by full-time UW Physics faculty (regular and research professors)

Motivations & Results

- Student motivations
 - Professional and career advancement
 - Seek qualifications for more interesting assignments
 - Career re-direction
 - Simple intellectual interest
- Graduates succeed!
 - Promotions with current employer
 - Secure new jobs
 - Define new career paths in R&D or teaching

What is required to apply?

Not just for physics majors

- BS degree in a physical science, mathematics, or engineering
 - Not limited to applicants who majored in Physics as undergraduates
 - Not limited to students who got top grades as undergrads... (tell your friends)
 - Not limited to *recent* graduates—some of our students took their BS degree 5 ~ 20 years ago

Not sure you are ready?

- Start as a Graduate Non-Matriculated (GNM) student (minimal requirements to start)
 - Take core courses to try out the program
 - See if it is a good match for your needs
 - May apply later for transfer to the MS degree program
 - Up to 12 GNM credits can be applied to the MS
 - OR take individual courses without committing to degree
- GNM is an option to expand your knowledge without committing to the degree program

Online class attendance

- All classes meet evenings, on the UW Seattle campus
 - **In-person classes will start again in Autumn 2021**
- PMSP **lecture** classes offer optional online attendance
 - Attend classes from home, work, or anywhere with an internet connection, using any common browser
 - *Zoom video conferencing* provides audio and video of the instructor, slides, chat window, and recordings of class sessions
 - Classes are not *designed* as online-only; we recommend in-person or real-time online attendance whenever you can
 - For the few courses with labs or other hands-on work, on-campus attendance may be required for some sessions

Admission Requirements

- **Reasonable** grades in relevant courses
 - B (3.0) grade average in 300-400 level undergrad physics courses or equivalent engineering courses
 - UW Graduate School requires 3.0 overall GPA in last 90 credits
 - Physical science and most engineering (EE, ME, CE, ChemE, etc.) BS programs include appropriate courses
- Statement of purpose
 - Your reasons to join the MSP
 - How PMSP connects to *your* goals
 - **NOT an essay contest:** used only for better advising
- GRE score is not required (or considered)

Admissions

- For admission to the *Physics MS Degree Program*, or as *GNM*, submit your application to the UW Graduate School online:
<http://www.grad.washington.edu/admissions>
- Applications are welcome at any time
 - *Most students start Autumn Quarter, but you may start in Winter or Spring (but not Summer) Quarter*
 - Apply for admission in the next academic quarter, or to start later
- New applications are reviewed every quarter (summer also)
 - Quarterly deadlines listed on website are the latest date we can *ensure* processing in time to start the following quarter, but applications are accepted until the end of the preceding quarter

Admissions FAQs

- Can I apply at any time?
 - Yes, we accept applications year-round
 - However, we strongly recommend *starting* in Autumn or Winter quarter, when intro-level core courses are offered
- What if my undergraduate degree is not in a physical science or engineering?
 - You need physics classes beyond the intro/100 course level, with good grades (GPA 3 or higher)
 - Most engineering programs include equivalent courses (mechanics, E&M, thermodynamics, etc.)
 - You can send your transcripts (informal, personal copy) to us for advice on your preparation

Admissions FAQs

- Should I contact you before applying?
 - **Definitely!** Please email emsp@uw.edu briefly describing your situation (location, previous education, goals) and we can provide pre-application advising
- What if I got my BS degree years ago?
 - Many of our students start after a decade or more in the workplace
 - Classes are designed taking into account your need for review, especially in relevant math
- What should my personal statement include?
 - The personal statement is **not** an essay contest, as with some college applications!
 - We use it only for advising purposes, to make sure your stated goals and expectations match our program's capabilities

Admissions FAQs

- Can I apply now to begin in autumn?
 - Certainly! We process applications toward the end of each quarter.
 - Apply to start in the term when you will be ready to begin classes
 - NOTE: You *must* register for credit in the term you applied to start
- What if work or family obligations come up and I need to take time off?
 - No problem! You can request **on-leave** status any time
 - MS students must be registered for credits OR be on-leave every term except summers, to maintain their status
 - GNM students only need to register for credits once per year – if you need more time off, apply for leave
 - However: the UW Graduate School requires you to complete your degree within **6 years of starting**

Admissions FAQs

- Can I complete my degree from outside the Seattle area?
 - All lecture courses offer optional attendance via Zoom
 - Slides, audio and chat windows are recorded and can be viewed later
 - No lab courses are required for graduation
 - For your final independent study (capstone) project, you will need to find a topic that you can pursue remotely, and a faculty mentor willing to supervise you via email or videoconferencing
- I don't really need an MS degree – I just want to learn more physics
 - Great! The GNM option is just what you want
 - You only need to enroll in one term per year (or request leave)
 - MS degree students must register for credit or request leave in 3 terms/year

MS Degree Requirements

- 1 - Complete three of the four core courses (4 credits each)
 - PHYS 543: Electromagnetic Theory
 - PHYS 441: Quantum Physics
 - PHYS 544: Applications of Electromagnetic Theory
 - PHYS 541: Applications of Quantum Physics

} Offered every year,
Autumn and Winter

} Alternate years,
Spring term
- 2 - Complete at least 18 credits in *graded* courses
 - MSP offers one core and one elective course per quarter
 - You may take elective courses in other departments, with prior approval
- 3 - Complete a final independent study project
 - Submit project report (not a formal MS thesis)
 - Oral exam on your independent study topic
- 4 - Accumulate at least 36 credits (courses plus independent study)

Electives recently offered

- Quantum Computing
- Contemporary Optics
- Physics of Lasers
- Numerical Methods for Physics Data Analysis
- Nuclear physics: sources, detectors, and safety
- Acoustics
- Physics of Renewable Energy Sources
- Radiation and Radiation Detectors
- Condensed Matter Physics

Customize your program with independent study courses

- Exploratory independent study courses (typically 1 or 2 credits)
 - Mentored by a Physics faculty member
 - Customize your studies to match your personal goals/interests
 - Choose your own topic, select from a list of suggested topics, or work with faculty on their research program in preparation for a final project
- Final Independent Study Project (6 - 18 credits)
 - Work with faculty in Physics, or professors in other departments
 - MS students typically participate in ongoing research projects with faculty and PhD students
 - Or, define your own project topic
 - Some do job-related research under faculty supervision

Choose a research area that fits your goals

UW Physics Department Research Groups

- Browse Physics Department research group web pages to find faculty members who may be mentors for independent study projects:

Astrophysics	Nanoscale Physics
Atomic Physics	Neutrino Physics
Biological Physics	Nuclear Experiment
Collider Physics	Nuclear Theory
Condensed Matter Experiment	Particle Experiment
Condensed Matter Theory	Particle Theory
Energy Sciences	Physics Education
Gravitational Physics	Precision Measurement
	Quantum Information

For complete list, see <https://phys.washington.edu/research>

Physics Adjunct Faculty in other departments

- See the Physics Department website for list of faculty in other departments who are *adjuncts* in Physics (can supervise Physics grad students):

Astronomy

Aeronautics and Astronautics

Applied Mathematics

Atmospheric Sciences

Bioengineering

Center for Nanotechnology

Chemistry

Earth and Space Sciences

Electrical Engineering

Materials Sciences

Physiology and Biophysics

Radiology

- We also have *Affiliate Professors* outside UW, at National Labs (PNNL, Argonne, Los Alamos), and at other institutions

Your final project

- Recruit a Physics faculty member to be your supervisor/ adviser/mentor
- Schedule and enroll in independent study (PHYS 600) courses each term (typically 2~8 credits/term)
- Prepare written report to summarize project and findings
 - Typically 20–50 pp, formatted as a technical report
 - Final oral examination:
 - Presentation of project and findings (typically 30 min.)
 - Questions posed by panel of two or more faculty
 - Submit final written report

Administered jointly by Physics Department and UW PCE

- Upon successful completion, you are awarded the MS in Physics by the UW Graduate School
 - **Same diploma as any full-time/daytime UW MS student**
 - All academic aspects are handled by Physics faculty
- PMSP degree program is administered by UW Professional & Continuing Education (PCE):
 - Course registration is handled by UW PCE
 - PMSP is one of more than 100 graduate degree programs administered by PCE

Program costs

- PMSP is a self-supporting (not state-supported), fee-based degree program
- **FOR YOU: FREE ! – via Boeing’s Learning Together Program**
 - Easy to sign up and register for classes
- FYI: Tuition is currently \$759/credit
 - Tuition is intended to match UW resident graduate tuition
 - Total course fees/tuition for degree program (36 credits) is about \$28K
 - Loans are available for some students

Contact Information

Website: www.physicsmasters.uw.edu

For questions about academics, admissions criteria, course offerings, prerequisites, independent study:

- **Jeffrey Wilkes**, Faculty Coordinator for PMSP
emsp@uw.edu

Note: **Prof. Anna Goussiou** will take over my role at the end of Summer 2021

Use email address above to reach the current acting coordinator.

To get email notices about information meetings, upcoming application deadlines, etc. :

www.physicsmasters.uw.edu/email-signup/

For all questions about UW regulations, application forms and admissions process:

- **Catherine Provost**, Graduate Student Advisor
(206) 543-2488
cuala@uw.edu

For all questions about registration and payment options:

- **Brian Cox**, Operations Manager
(206) 616-5104
bc26@uw.edu

Questions ?

- These slides are available at <http://depts.washington.edu/emsp/infosessions/>
- For further info please visit our website, www.physicsmasters.uw.edu or email emsp@uw.edu