

# Introduction to the Purdue Medical Physics Program

Ulrike Dydak  
Director, Medical Physics Program

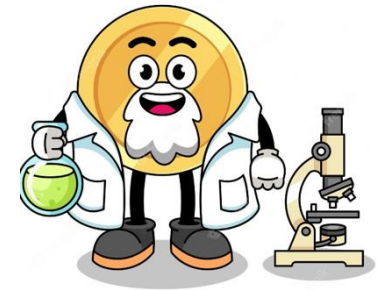


## Outline:

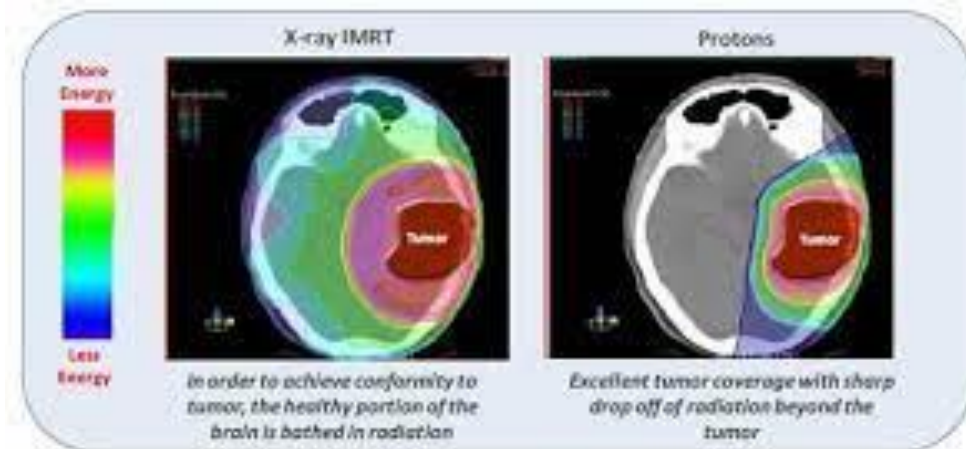
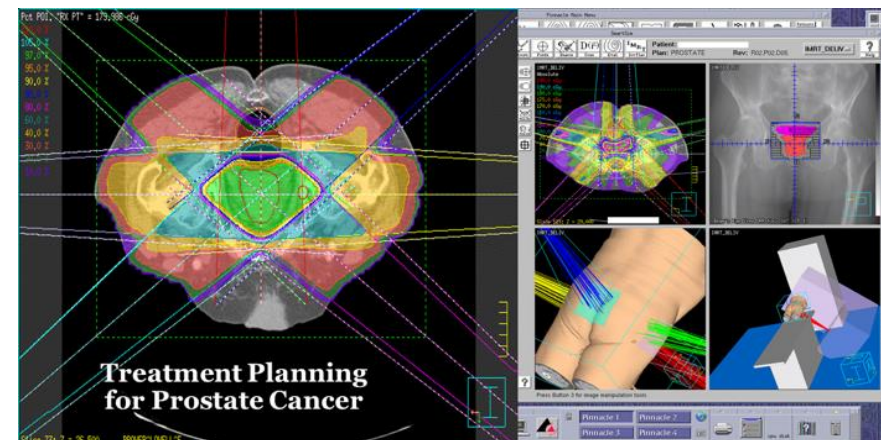
- [What is Medical Physics?](#)
- [Path to ABR Certification](#)
- [Purdue Medical Physics Program](#)
- [Medical Physics Club of Purdue](#)
- [Application info](#)
- [Purdue University](#) and [West Lafayette](#)



- Medical Physicist and the Medical Doctor, specifically the Oncologist/Radiation Oncologist and Radiologist, are two sides of the same coin.
- For example,
  - the Radiation Oncologist determines the best cancer treatment for the patient based on their cancer,
  - the Medical Physicist determines the best way to apply the radiation for each individual patient.



- Medical Physicist considers ...
  - Applying uniform dose to tumor
  - Minimizing dose to normal tissue
  - Avoiding dose to critical organs
  - How to reposition and apply this dose reproducibly every day for 4-6 weeks
  - Type of radiation to use (x-rays, electrons, protons)
  - Adapting the treatment
  - Optimizing diagnostic imaging procedures and methods
  - And many other considerations

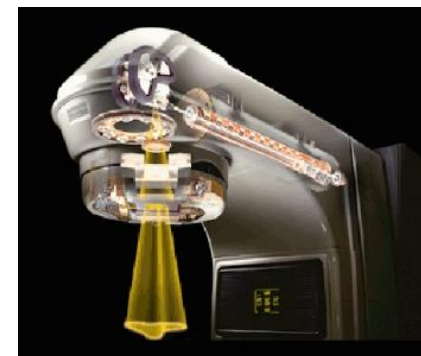


- The excess dose to healthy tissue from x-ray IMRT compared to protons is equivalent to exposing your brain up to 450,000 dental x-rays without a lead shield



- Medical Physicist expertise ...

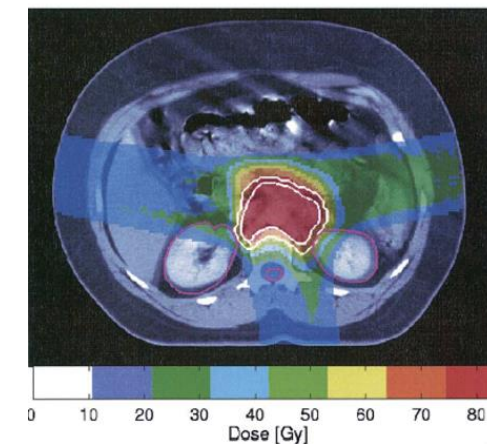
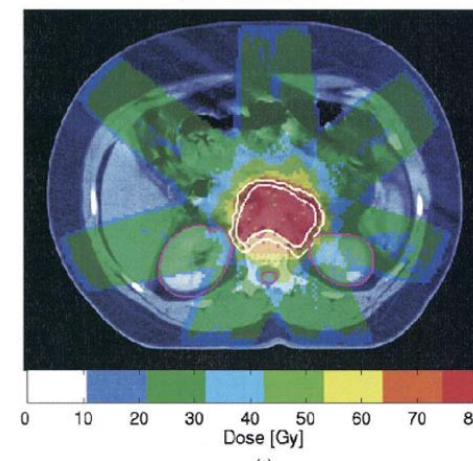
- Understanding advanced radiation producing equipment (accelerators, instrumentation to measure radiation, etc.)
- Understanding advanced medical imaging equipment and protocols
- Quality assurance and control
- Advanced software tools (computational methods, AI, etc.)
- Integrating new technologies into the clinic
- Research and develop better methods and technologies
- ...



B:IMRT

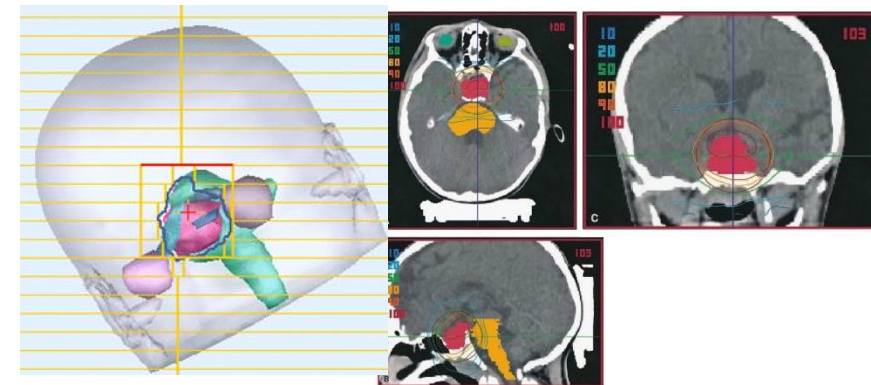


B:IMPT



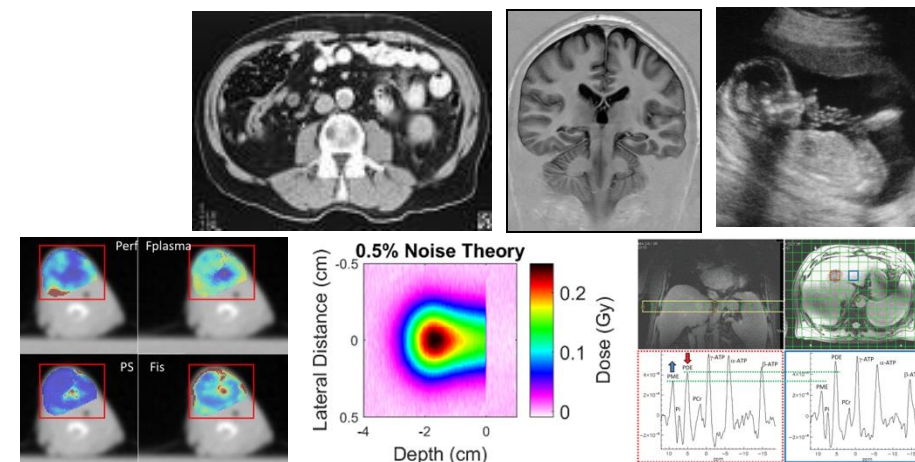
- Radiation Therapy Physics

- Utilize advanced technology to apply external beam radiation, such as IMRT, SBRT, SRT, Electron Beam Therapy, Proton Beam Therapy, etc.



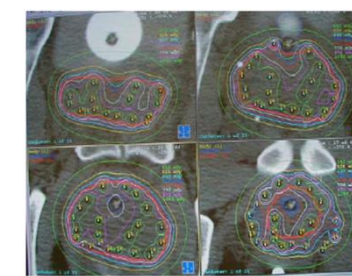
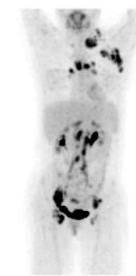
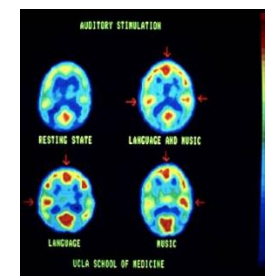
- Diagnostic Imaging Physics

- Being the expert in the clinic on developing, implementing and applying state-of-the-art medical imaging possibilities, specializing in X-ray, PET, SPECT, Fluoroscopy, CT, MRI and US.



- Nuclear Medicine Physics

- Instead of external radiation sources, the focus is on radioactive material inserted into the body
- Therapy component (radioactive isotopes and seeds) and Diagnostic component (PET/SPECT)



## Clinically-focused Position

- University Hospital
- Community-based Hospitals
- Companies Performing MP Service

## Industry

- Radiation Therapy Physics – Elekta, Varian, IBA, BrainLab, Fluke, etc.
- Medical Imaging (R&D) – Siemens, Philips, GE, Toshiba, Sony, etc.
- Nuclear Medicine Techniques – Eli Lilly, etc.
- Numerous other companies

## Government (NRC, Military, etc.)

## Academia and Research Centers

- Faculty at Universities and Colleges
- Cancer Centers
- Many others

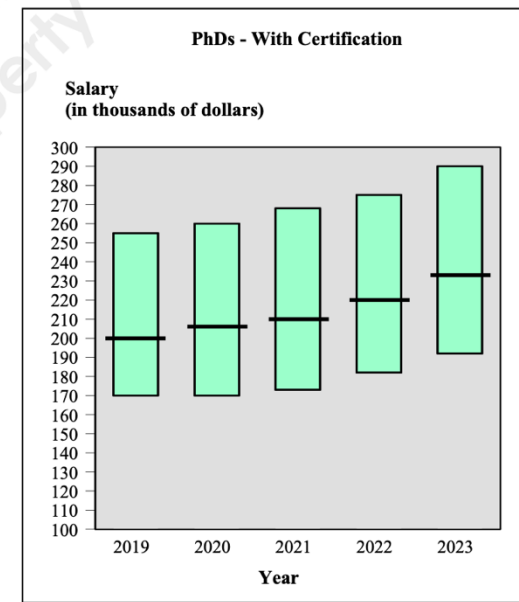
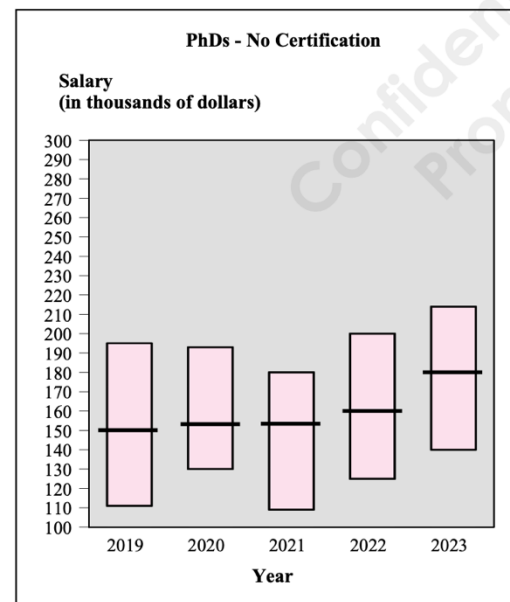
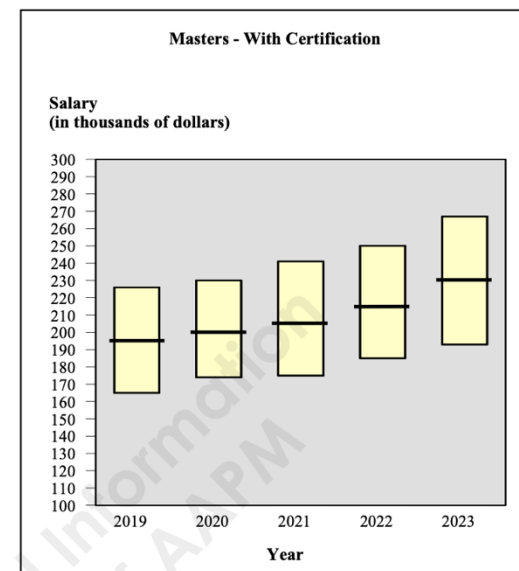
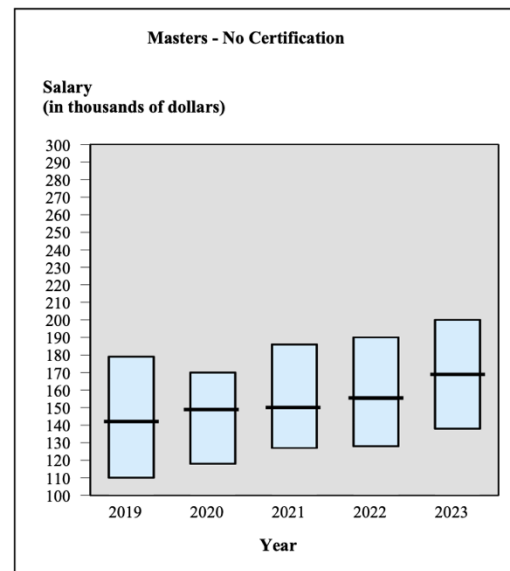
## MS degree:

- MS w/o certification: \$140- 190,000
- MS with certification: \$190- 270,000

## PhD degree:

- PhD w/o certification: \$140 – 210,000
- PhD with certification: \$190 – 290,000

**Source: 2023 American Associate of Physicist  
in Medicine (AAPM) Salary Survey**



1) **Physics** Major/Minor, or related STEM, degree e.g. RADH (pre-MP)

2) CAMPEP Medical Physics **Graduate Degree**

- MS (2-years) (or 4+1 program with RADH)
- PhD (5-years), or
- Graduate MP Certificate (9-months)

← Pass **Part 1 of the ABR Exam**

3) CAMPEP Medical Physics **Residency** Program (2 years)

- Radiation Therapy Physics
- Diagnostic Imaging Physics
- Nuclear Medicine Physics

← Pass **Part 2 of the ABR Exam**, in one of the above specialty areas



Pass **Part 3 of the ABR Exam** (Oral Exam)



CAMPEP accredited since 2012

## Core Required Courses (AAPM Report 197)

### Total 25 CR

- [Medical-Physics-Requirements.pdf \(purdue.edu\)](#)

### Prerequisites:

- Human Anatomy and Physiology
- Physics Minor
- Prerequisites can be taken at Purdue on MS or PhD track
- Physics Prerequisites must be fulfilled for Certificate

## Research Project (6+ CR)

### Projects in all Specialties

- 8 MP Professors in Health Sciences
- 9+ affiliated Professors at IUSM & Purdue

### Present at Conferences

- AAPM, ASTRO, RRS, RSNA, ISMRM, WMIC

### Work in Collaborative Research

### Environment

- Purdue, other institutions national and international

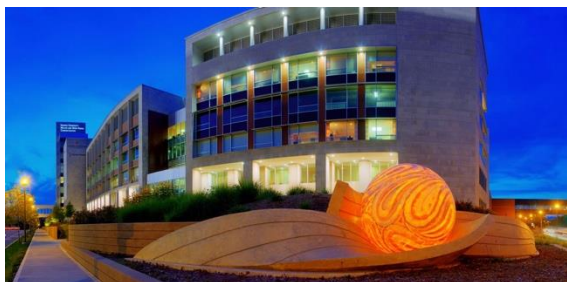
## Selective Courses (9+ CR)

### Clinical Internships

- Therapy Physics: at IUSM, 6CR, over two courses
- Imaging Physics: at Purdue, 6CR, over two courses
- Advanced Imaging Physics: at Springfield, Mo, full-time, in summer

### Advanced Courses

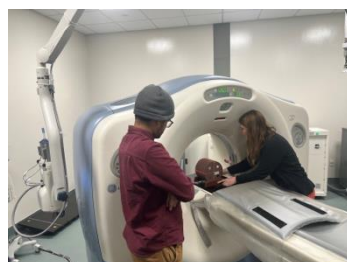
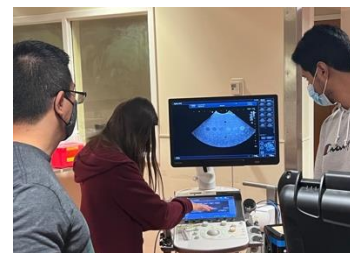
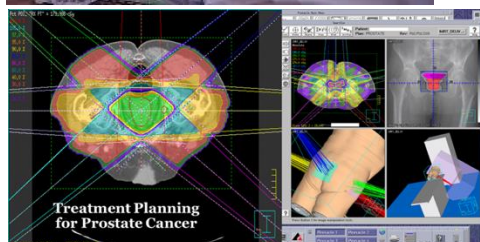
- Medical Imaging
- AI and Data Science



Indianapolis, Radiation Oncology, IUSM



Purdue Life Sciences MRI Center and Radiology



## Selective Courses (9+ CR)

### Clinical Internships (Hands-On)

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### Advanced Courses

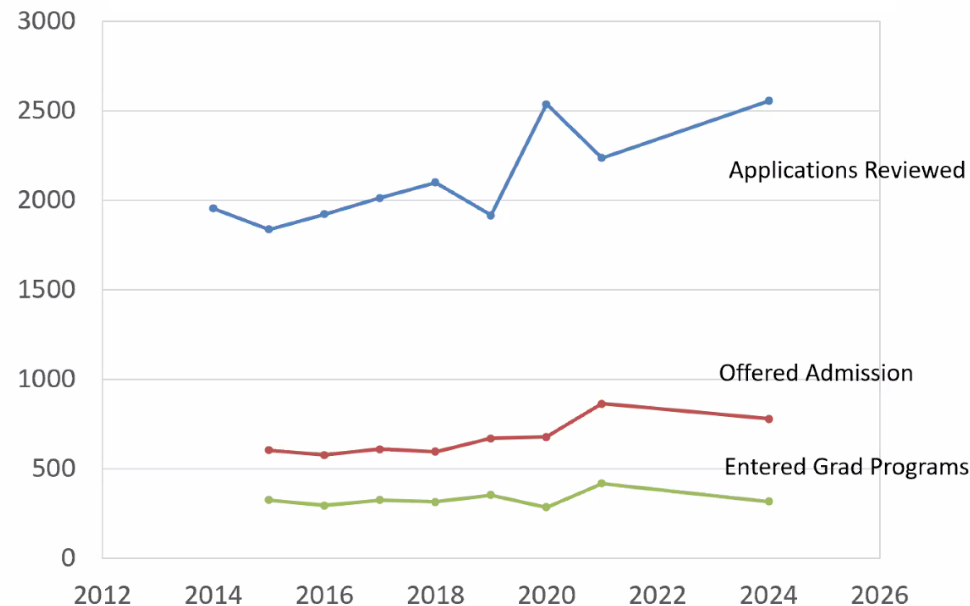
- Medical Imaging
- AI and Data Science

Average size of program:

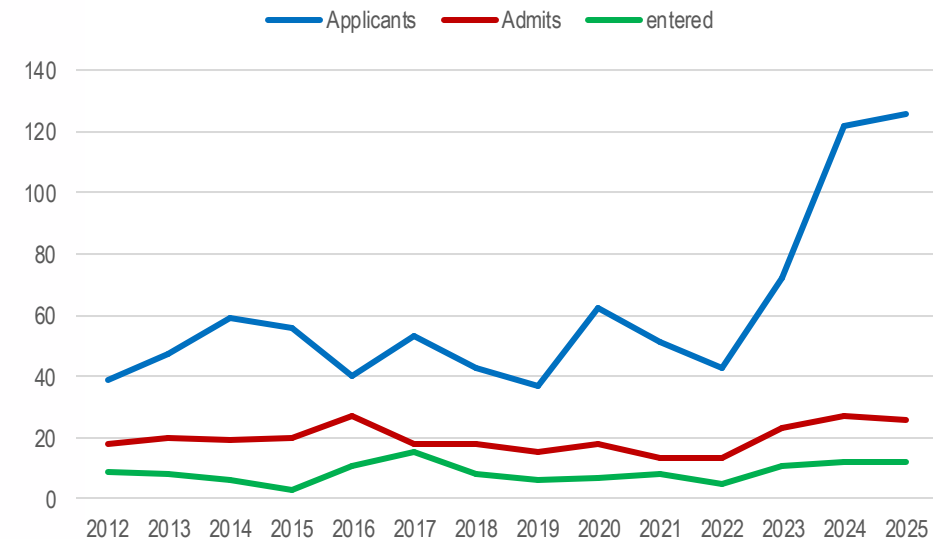
total	~ 30 students
MS students	5 – 12
PhD students	12 – 18
Certificate students	1 - 3

Applications and Admits:

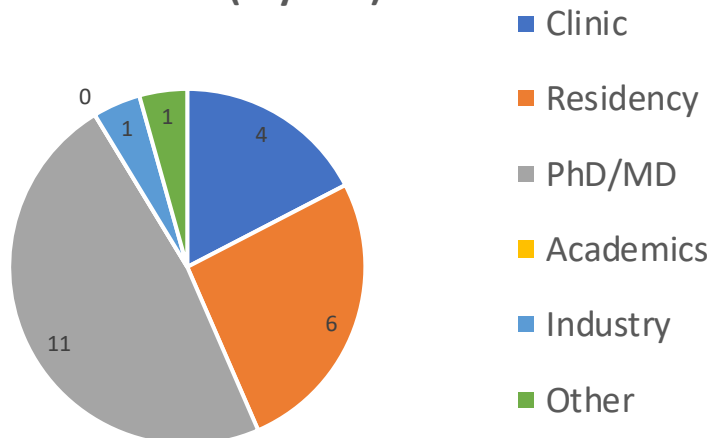
All CAMPEP GRAD Programs



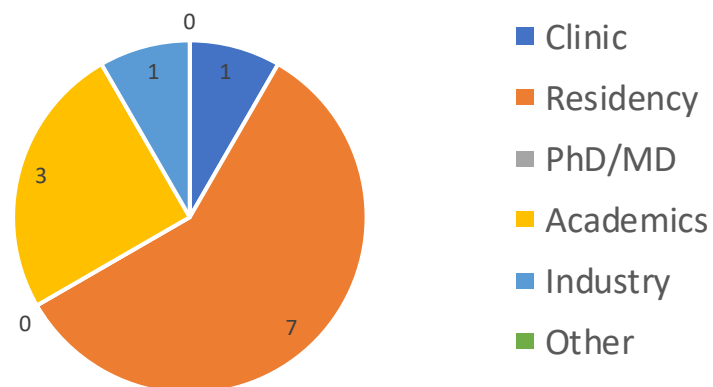
Purdue MP Program



**Graduates, MS  
(5-years)**



**Graduates, PhD  
(5-years)**



## Examples of Alumni over the past 4-5 years:

### PhD Programs:

- Purdue
- Case Western
- U Wisconsin
- U Florida
- CERN

### Residency:

- MD Anderson
- Yale
- Thomas Jefferson University
- University Hospital Cleveland
- U Florida Proton Therapy
- Upstate Medical Physics
- John Hopkins
- IUSM
- Oklahoma U
- U of Colorado
- Rutgers University
- LSU
- U Arizona
- Rush University
- Beaumont
- Northwell Health

### Physics

### positions/Industry:

- Reid Hospital, Physics position
- Washington U, Physics position
- Cook Research
- Post-Doc Triumph

\* 4 Certificate Students, all obtained a Residency



## Purdue Faculty in the School of Health Sciences:



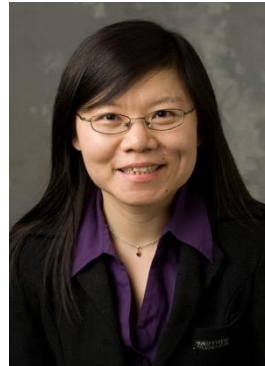
Ulrike Dydak



Matthew Scarpelli



Seyi Oderinde



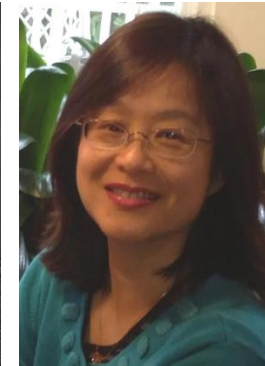
Linda Nie



Aaron Specht



Keith Stantz



QiuHong He



Alison Roth



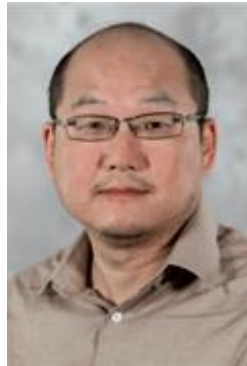
Jessica Hsu

## Adjunct Medical Physics Faculty:



Chris Njeh

Indiana University School of Medicine,  
Radiation Oncology



Heping Xu



Jason Parker

IU School of Medicine  
Radiology and Imaging Sciences



Qiuting Wen



Jason Allen



Michaela Coyne

Community Health Network MD Anderson  
Cancer Center



Colleen DesRosier



Michael Ringor

Faith Hope and Love  
Cancer Center

## 2025-2026 Leadership



**Jessica George**  
*President*

**Qi Wang**  
*Vice President*

**MacKenzie Coon**  
*Treasurer*

### Hosting (in-person or virtually) of professional physicists

- Purdue Alumni, Residents, Researchers, Clinical, Industry...
- Hear their journey, their day-to-day activities, develop your network

### MP Journal Club activities

- Group wide discussion, with MP faculty representative



### ABR Question Review

### Support in Developing CVs


### Student hangouts and socials



**FOOD**

## Application requirements

- Transcripts
- Official GRE scores
- Three recommendation letters
- Academic statement of purpose
- Personal history statement
- Resume/CV
- International Students: English Proficiency Requirements



Deadline for full consideration:  
**December 1**

More information:

<https://www.purdue.edu/gradschool/prospective/gradrequirements/westlafayette/med.html>



Meeting some of these criteria makes you more competitive

- $\text{GPA} \geq 3.5$  (PhD),  $\text{GPA} \geq 3.2$  (MS)
- $\text{GRE} \geq 300$
- Good grades in physics/math classes
- research experience (any)
- MP shadowing or MP research, or having talked to MPs  
=> show that you know what medical physics is about!
- strong recommendation letters (choose professors, research advisors, clinical staff you shadowed with)

For PhD applicants:

- Contact individual faculty, identify faculty of interest in application!
- Consider also applying to the MS degree
- Admission is fully dependent on faculty funding (bottleneck)



Purdue tuition has been frozen since 2012!

PhD students are funded by faculty advisors

Stipend: \$28,000

Benefits: <https://www.purdue.edu/hr/benewell/>

MS and Certificate students are self-funded

Tuition per semester:

Indiana residents: \$4,996.00

Nonresidents: \$14,397.00

International: \$14,552.00

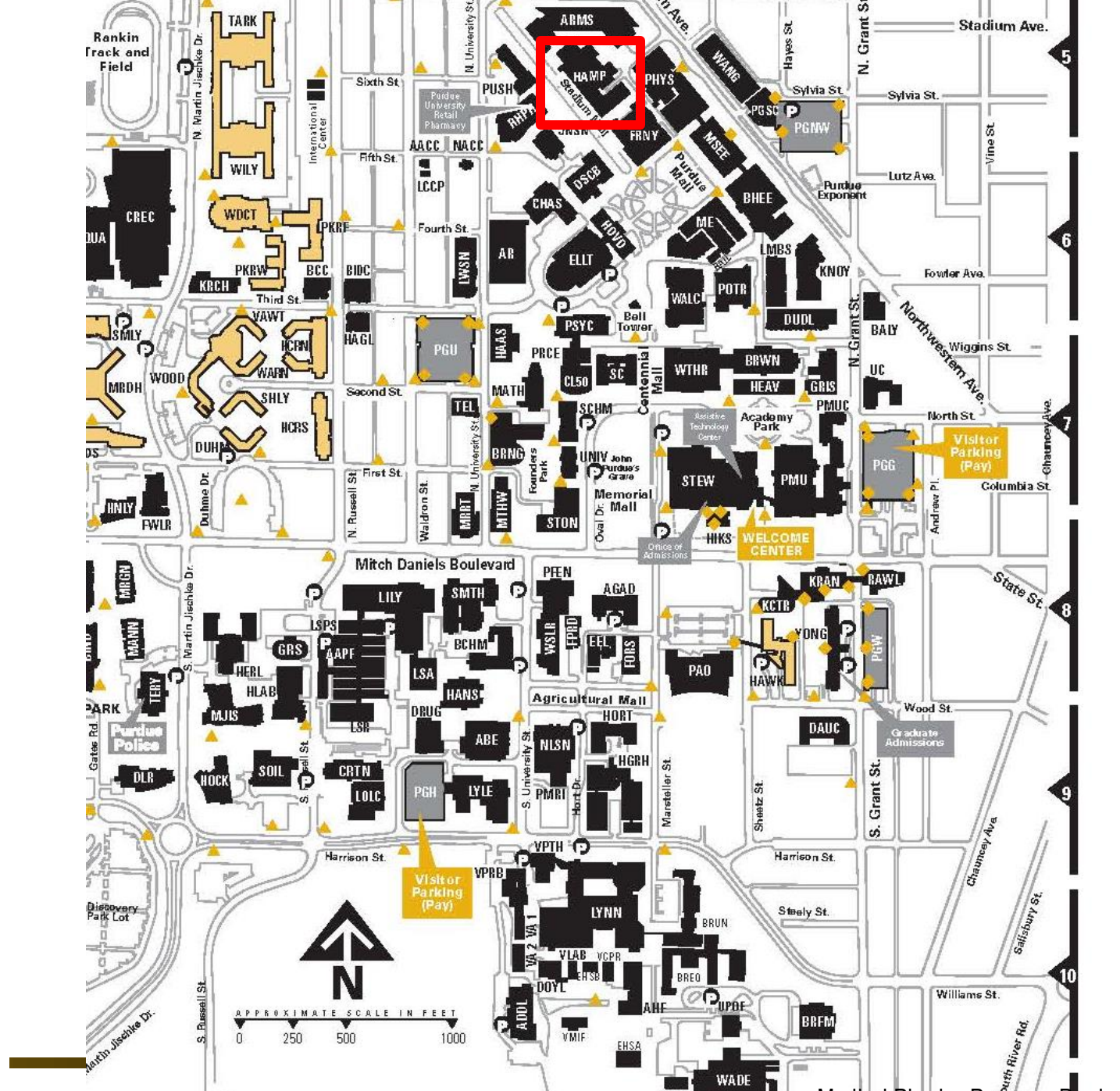
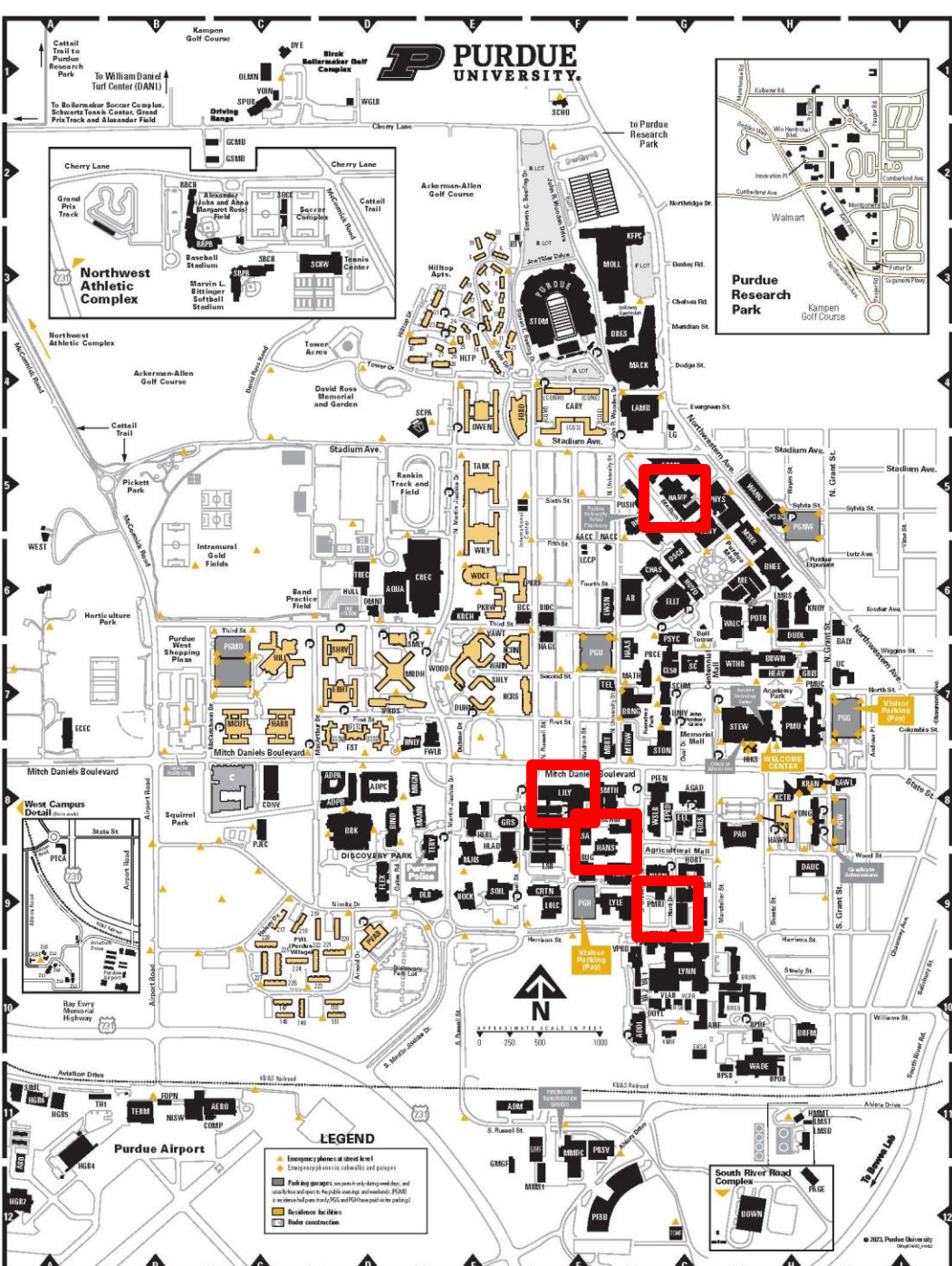
<https://www.purdue.edu/treasurer/finance/bursar-office/tuition/fee-rates-2025-2026/graduate-tuition-and-fees-2025-2026/>

- Can the GRE be waived?
  - *No, it can not be waived, but we will honor official scores that come in during December*
  - *Students graduating from Purdue and applying to our program won't need the GRE*
- Can the application fee be waived?
  - Check [info on application fee waivers](#) – *only a certain number of waivers available per year, they are usually gone by October!*
- I already took several MP classes. Will I need to retake them at Purdue?
  - Anatomy & physiology or physics classes: may be waived if equivalent to requirements
  - Core medical physics classes will not be waived due to CAMPEP accreditation, unless you already have a MS degree from a CAMPEP-accredited program
- Can I apply for a TA-ship?
  - Most likely not; we have only ~1-2 TA-ships that go primarily to PhD students



[Visit Purdue Virtually](#)



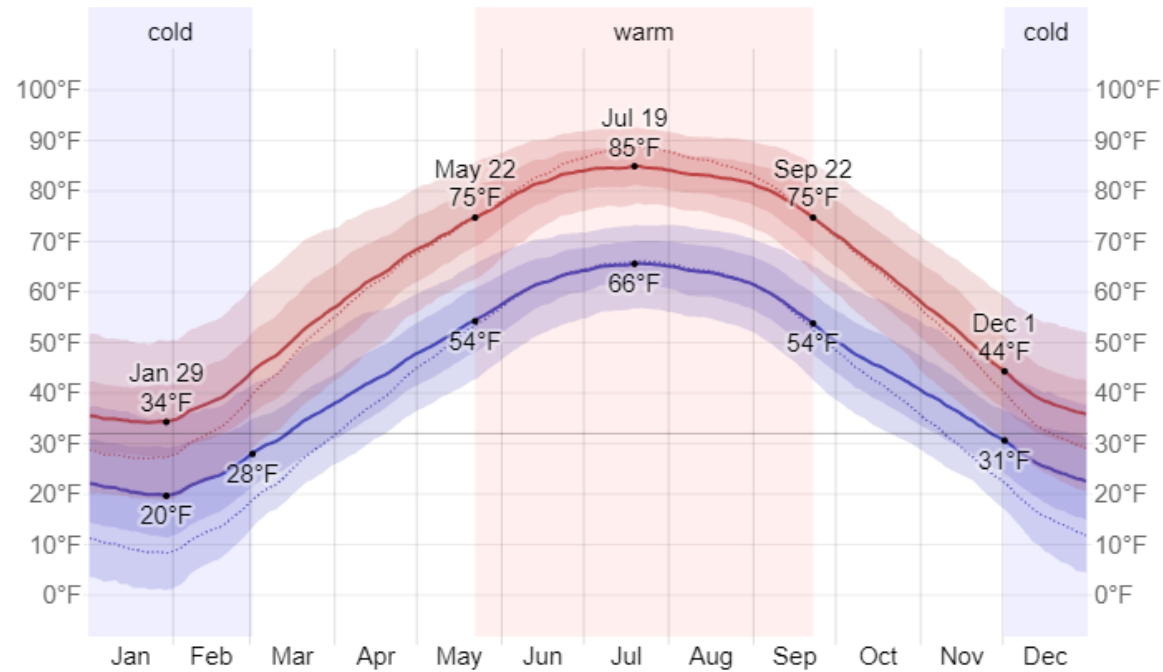




Restaurants from around the world  
Downtown Lafayette shopping & dining  
Local breweries and distilleries  
Parks & connected trail system throughout greater Lafayette  
On-campus, community, and national theater and musical events  
Purdue athletics & local baseball team



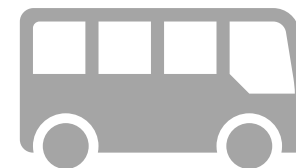
<https://www.homeofpurdue.com/things-to-do/>





## Average apartment rent within two miles of campus: \$1,552

Apartment (and house) market is tight in West Lafayette due to campus growth – don't leave finding a place to the last minute



## How to get around

Car (\$100 campus parking/year:

<https://www.purdue.edu/parking/permits/west-lafayette/students/index.html#c>)

West Lafayette/Lafayette Bus system (<https://gocitybus.com/>)

Biking (<https://www.westlafayette.in.gov/our-city/getting-around/bike-program>)

West Lafayette Scooters/Bikes – (<https://www.veoride.com/purdue-university-and-west-lafayette-in/>)

Apartment shuttle bus (if in specific complexes)

<https://www.purdue.edu/gradschool/admitted/housing-and-relocation/cost.html>

Join our **virtual Open House** on Nov 3, 10 – 11 am EST  
(see Purdue Medical Physics Webpage for dates)

Or

Join our **virtual “office hour”** to ask questions  
On Nov 17 (time & link will be announced)

Or

Write to us: [medphys@purdue.edu](mailto:medphys@purdue.edu)