

Purdue University

Master of Science (MS) in Radiopharmaceutical Manufacturing

Indiana Commission for Higher Education

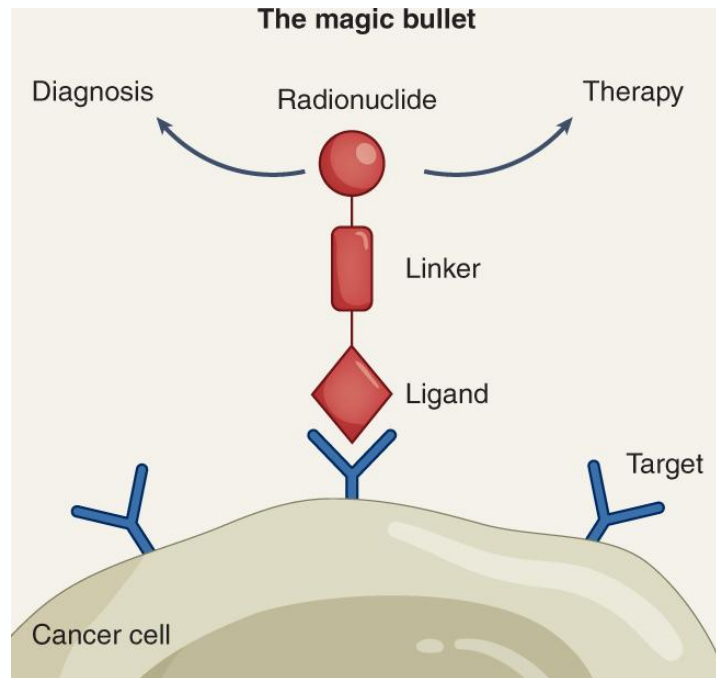
March 13, 2025



Theranostics

Therapy + **Diagnosis**

- Components:
 - Biomarker (targeting molecule)
 - Linker
 - Radioactive isotope



Radiopharmaceutical Manufacturing (RP)

Overview



- RP manufacturing has the same expectations as any other sterile product manufacturing
 - Aseptic processing
 - Manufacturing facilities design
 - In-process controls
 - Testing and release



- Radiation handling requirements are set at the Federal level by the US Nuclear Regulatory Commission (NRC) for ANY handler of radioactive materials
- Introduction of radioactive materials drastically changes production schedules and drug expiration
- Handling large quantities of radioactive materials introduces additional occupational safety considerations

Purdue RP Consortium

Industry Led Initiative: Established 2023

RP Manufacturers



Isotope Production



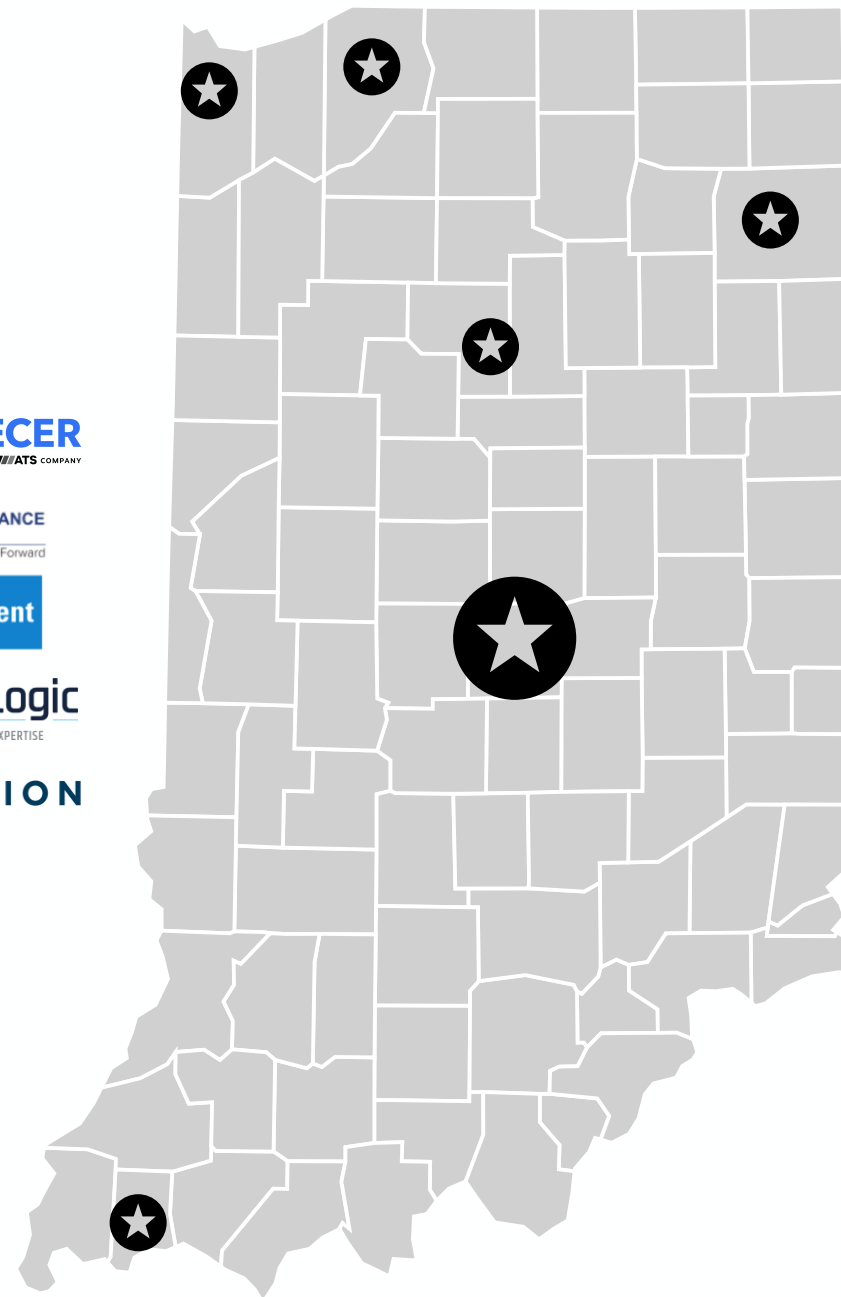
RP Distributors



Suppliers



Academic Collaborators



MS Radiopharmaceutical Manufacturing

Industry-Driven

- 19 credits of Core Requirements
 - Fundamental radiation safety knowledge
 - Manufacturing processes
 - Quality management
 - Regulatory (manufacturing and radiation)
 - Seminar: Current issues
 - Capstone: On-site, experiential

MS Radiopharmaceutical Manufacturing

Industry-Driven

- 21 credits of Electives with a minimum of 13 credits across 2 focus areas:
 - RP manufacturing product development
 - Chemistry
 - Microbiology
 - Instrumentation
 - Data analysis
 - Project management
 - Smart manufacturing process – RP manufacturing
 - Financial management
 - Facility design

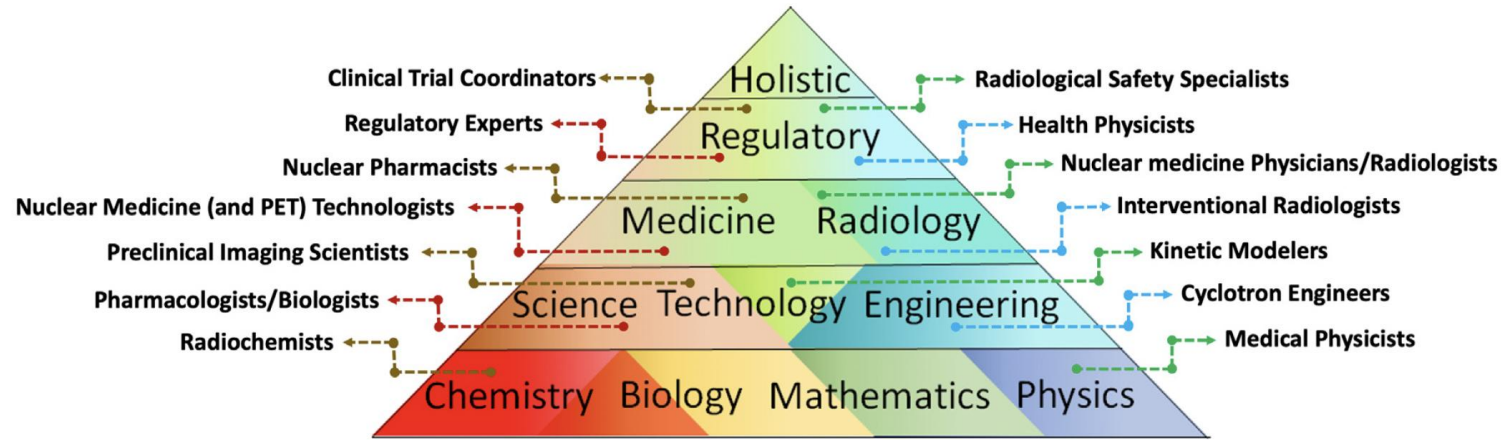
MS Radiopharmaceutical Manufacturing

Hands-on Elective Opportunities

- Radiopharmaceutical equipment laboratory
 - Purdue RP Training facility – Zionsville
 - 1600 square foot dedicated facility for RP manufacturing operational training
 - Equipment
 - Mock clean room / production suite
 - Licensed for radioactive materials
- Radiopharmaceutical manufacturing work experiential
 - Various corporate locations

Workforce Needs

In Indiana.....and beyond



Nuclear Medicine and Biology: 2020

Fig. 1. Proposed framework of subject area divisions for various specialists and professionals working in nuclear medicine and the radiopharmaceutical sciences.

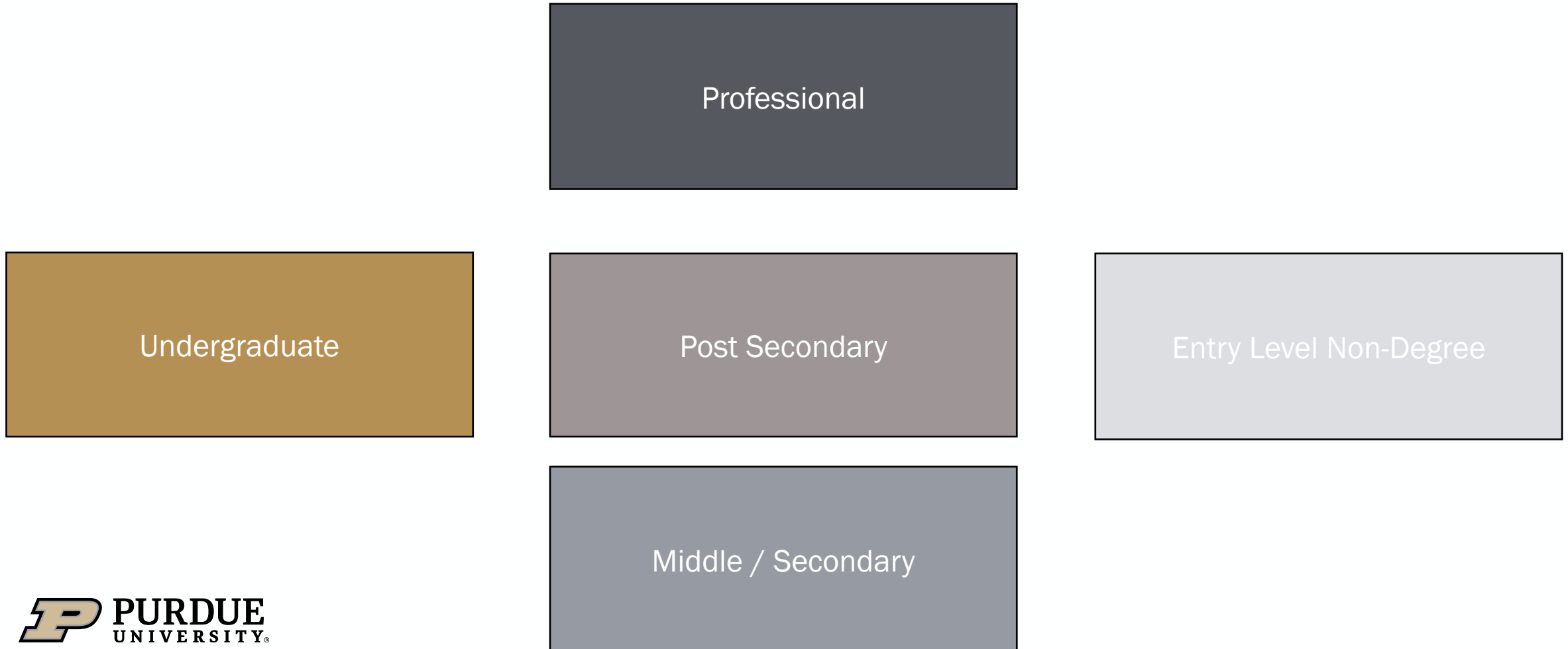
Trends in nuclear medicine and the radiopharmaceutical sciences in oncology: workforce challenges and training in the age of theranostics

Lancet Oncology: July 2024

“One issue of paramount importance for achieving equitable access to theranostics is building a sufficiently trained workforce in high-income, middle-income and low-income countries”

Education

Workforce Development



Kara Weatherman
Clinical Professor / Director of Radiopharmaceutical Programs
kdwman@purdue.edu

