

School of Nuclear Science and Engineering  
OSU Oregon State University  
COLLEGE OF ENGINEERING

## Health Physics in Higher Education – Are We At A Tipping Point?

Kathryn Higley, PhD, CHP  
Professor and Head, School of Nuclear Science and Engineering  
Oregon State University

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### tip·ping point

*Noun*  
the point at which a series of small changes or incidents becomes significant enough to cause a larger, more important change.

the critical point in a situation, process, or system beyond which a significant and often unstoppable effect or change takes place.

Oregon State OSU

---

---

---

---

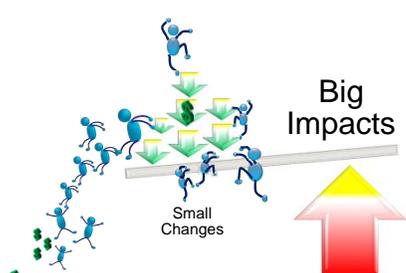
---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering



---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Small Changes: Professional Society Membership

"My prediction is that we will bear witness to an ever-declining Society over the next decade" Howard Dickson, CHP

"While the number of licensees and emergency responders using radiation detectors has grown steadily over the last decade, the number of HPS members has been steadily shrinking." Andy Karam, CHP, PhD

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Small Changes: Declining Professional Memberships

Membership in the Radiation Research Society, Presented by John D. Boice Jr., July 19, 2013 at the NCRP Meeting "Where are the Radiation Professionals? (WARP) Initiative.

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Small Changes: Declining Enrollments

US Academic Institutions – HP Enrollments 1975 through 2014

5 <https://orise.orau.gov/files/sep/HP-Brief-75-2014-data.pdf>

---

---

---

---

---

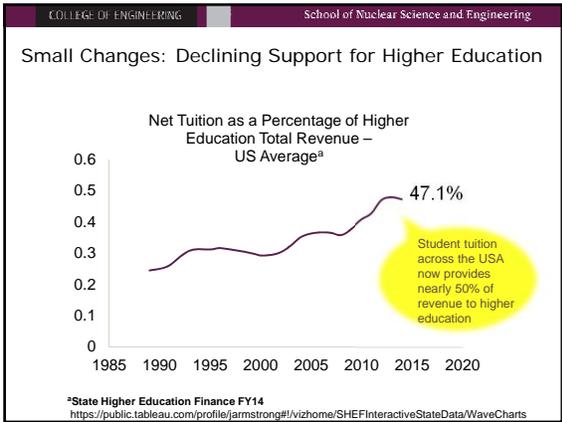
---

---

---

---

---




---

---

---

---

---

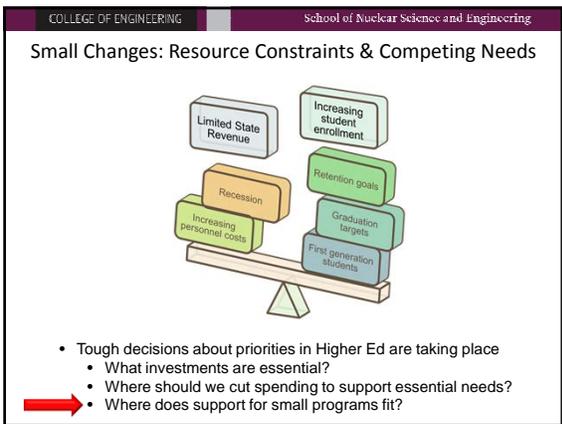
---

---

---

---

---




---

---

---

---

---

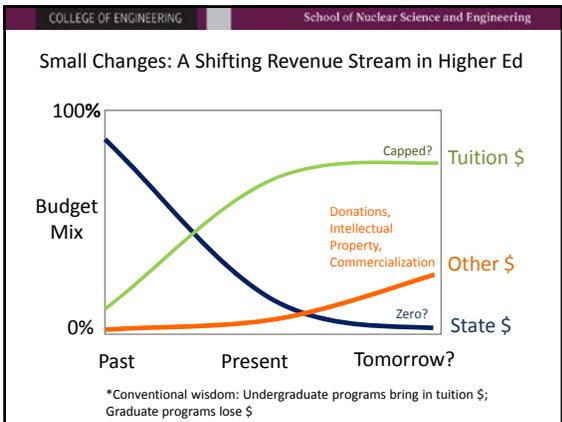
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Small Changes: "Productivity Targets" in Higher Ed

- Metrics vary
  - Basically a budgetary consideration.
- Example: University of North Carolina metrics for closing programs:
  - "A bachelor's program is considered to be "low productive" if:
    - it has awarded fewer than **20** degrees in the previous two years;
    - upper division (juniors and seniors) enrollment is less than **26** students; and
    - fewer than **11** degrees have been conferred in the most recent year.
  - For master's and doctoral programs, those numbers change, but the focus is still on degrees awarded and enrollment."

<http://www.popecenter.org/commentaries/article.html?id=3073>

OSU

---

---

---

---

---

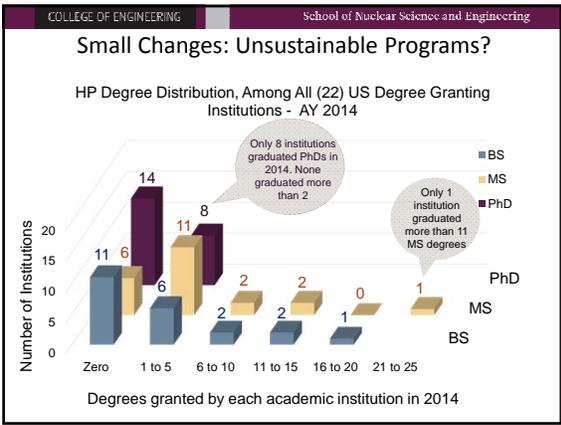
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Small Changes: Declining Support for Academic Research

"..only \$2 million of ...\$15 million was awarded to health physics programs..." Nancy Kirner, CHP, HPS President<sup>a</sup>

<sup>a</sup>US DOE Integrated University Programs funding, 2015

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### What Are the "Big" Impacts?

Small Changes  
(retirements, deaths,  
graduations,  
resources..)

Big Impacts?  
(Safety, security,  
legislation, lawsuits,  
capacity)

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Big Impacts: Nuclear Security?

ASSURING A FUTURE U.S.-BASED Nuclear and Radiochemistry Expertise

Is there a Crisis in Nuclear Radiochemistry Education?  
Heino Niesche  
University of California and Lawrence Berkeley National Lab

NUCLEAR FORENSICS  
A CAPABILITY AT RISK  
(International Atomic Energy Agency)

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Big Impacts: (Mis)Informed Policies & Standards?

ANALYSIS OF REGULATORY CHANGES TO THE 10 CFR PART 20 DOSE LIMITS

- Linear No-Threshold
- Epigenetics and long term risks
- Individual human radiosensitivity
- High LET radiation and human space flight
- Dose calculation system
  - Whole body / Critical Organ
  - Whole body / dose equivalent / effective dose equivalent
  - Equivalent dose / effective dose
  - Detriment
  - .....

---

---

---

---

---

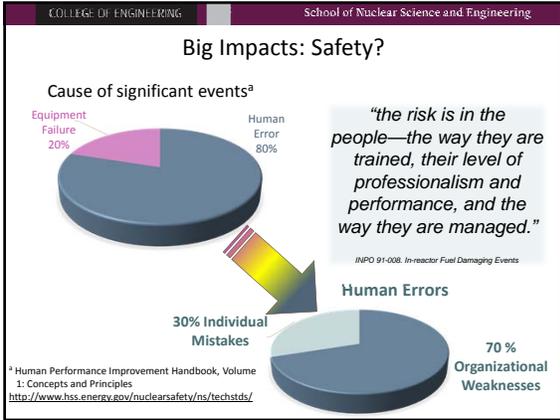
---

---

---

---

---




---

---

---

---

---

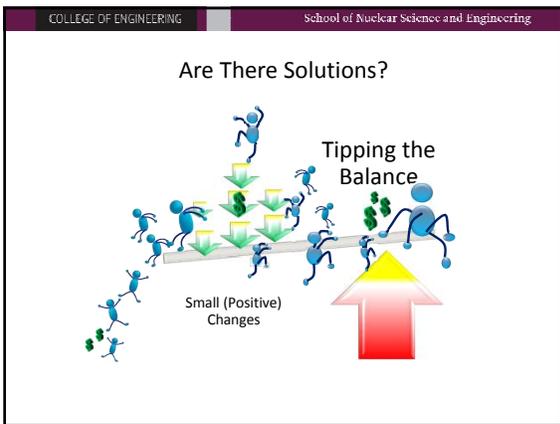
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

- COLLEGE OF ENGINEERING School of Nuclear Science and Engineering
- ### Possible (Small but Positive) Changes
- Cooperation and cash
    - Industry and government must support academic programs
    - Continue scholarships, fellowships and internships
    - Add research set asides for academic programs
  - Recognition and respect
    - Designate certain expertise (HP and others) 'areas of strategic national need'
  - Regulation and retention
    - Reclassify Health Physicist in OPM system – broaden coursework requirements in radiation dosimetry, radiation protection, measurements, shielding, regulations, and radiation biology in order to be considered a HP.
    - NRC (and other equivalent organizations) mandate stricter education and or licensure for certain jobs
- Oregon State **OSU**

---

---

---

---

---

---

---

---

---

---

COLLEGE OF ENGINEERING School of Nuclear Science and Engineering

### Conclusions

- HP academic programs are at a critical point
  - Many diverse reasons
  - A perfect storm
- Insufficient graduates can impact
  - Nuclear security
  - Safety
  - Legislation and standards
- Not to mention surge capacity.....
- Some (proposed) solutions exist
  - Cooperation and cash
  - Recognition and respect
  - Regulation and retention

Oregon State **OSU**

---

---

---

---

---

---

---

---

OSU Oregon State **COLLEGE OF ENGINEERING** School of Nuclear Science and Engineering

### Thank You

Kathryn Higley, PhD, CHP  
[Kathryn.Higley@Oregonstate.edu](mailto:Kathryn.Higley@Oregonstate.edu)  
541-737-0675  
<http://ne.oregonstate.edu/>

---

---

---

---

---

---

---

---