Flattening the Learning Curve:
Concise Coursework to Prepare Medical Physics Residents for Leadership

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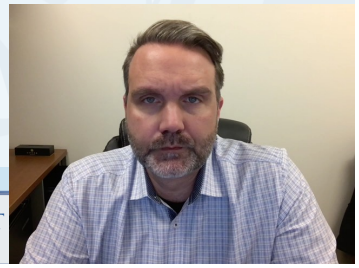


VANDERBILT
SCHOOL OF MEDICINE

I will be discussing the course designed for the Vanderbilt Medical Physics Residency Program

- M.Price, Vice Chairman for Physics (2017 – 2021)
- K. Holmann, Director of Medical Physics Residency Program (2019 - current)
- R. Rodgers, Deputy Director of Medical Physics Residency Program (2019 – current)

Vanderbilt University Medical Physics Residency Program

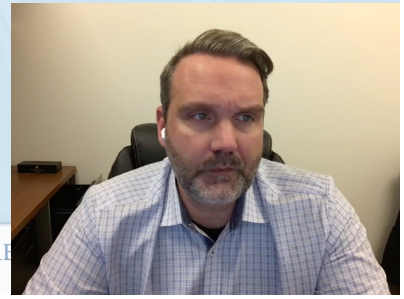
- First residents in 2019, accredited in 2021
- Spiritual successor to DMP program (therapy track shuttered in 2019)
- Four (4) positions, two (2) residents accepted annually
- Non-match program as of 2021

Reasoning behind creating the course …

1. AAPM Report 249 and AAPM's renewed emphasis on leadership training

2. Lack of a formal vehicle for soft-skill development for our residents (& graduate students)
   - Landing jobs / residencies
   - Flatten learning curve associated with first leadership opportunity

3. Differentiate the Vanderbilt program(s)
   - Distinct emphasis on training next-generation of leaders



Having the right support & people

1. Support by Department leadership
   - *e.g.,* Trainee presence at select vendor discussions, time allocation for faculty participation

2. (🍀) Faculty members with a wealth of experience leading teams in a variety of environments
   - *e.g.,* Academic departments, labs, community practice, military, industry

3. Faculty with formal executive leadership training

Leadership, Management & Ethics for Medical Physicists
Summer 2020

Week	Lecture	Date	Topic	Instructor
1	1	Tuesday, June 2, 2020	Introduction to Course, Profession Overview & Expected Behaviors	Price
1	2	Thursday, June 4, 2020	Balancing Leadership and Management	Price
2	3	Tuesday, June 9, 2020	Managing Performance and Motivation	Price
2	4	Thursday, June 11, 2020	Empowerment and Delegation	Price
3	5	Tuesday, June 16, 2020	Decision Making	Price
3	6	Thursday, June 18, 2020	Leading Change	Price
4	7	Tuesday, June 23, 2020	Exam 1 (Leadership)	
4	8	Thursday, June 25, 2020	Billing and Coding in Radiation Oncology	Price
5	9	Tuesday, June 30, 2020	Staffing models, Radiation Oncology	Price
5	10	Thursday, July 2, 2020	Staffing models, Radiology	DI faculty
6	11	Tuesday, July 7, 2020	Negotiating quotes & understanding contracts	Price
6	12	Thursday, July 9, 2020	Exam 2 (Management)	
7	13	Tuesday, July 14, 2020	Presenting New Technology to Administrators	Price
7	14	Thursday, July 16, 2020	Technology transfer & patents	Yock
8	15	Tuesday, July 21, 2020	Fielding Calls as a Medical Physicist	Price
8	16	Thursday, July 23, 2020	Financial Planning as a Medical Professional	Price
9	17	Tuesday, July 28, 2020	Interviews and negotiating your first contract	Price
9	18	Thursday, July 30, 2020	Overview of Grants and sources of research funding	Eley
10	19	Tuesday, August 4, 2020	Discussion of RSNA/AAPM Ethics modules	Homann
10	20	Thursday, August 6, 2020	Mock interview exercise	Faculty

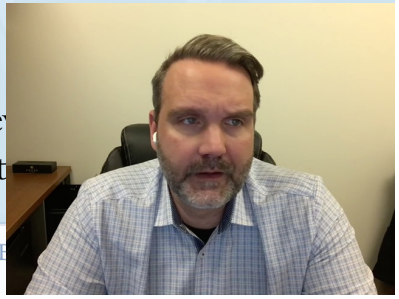
Three (3) credit-hour course during Summer session

General concepts of leadership

Essential topics of management for medical physicists

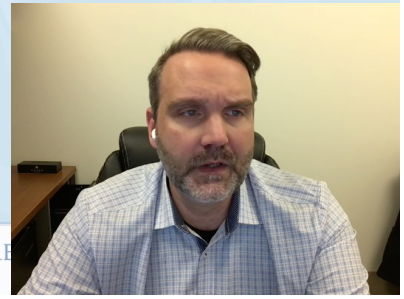
Diverse topics (entrepreneurial, research and professional skills)

Residents: Mock job intervie
Students: Mock residency int



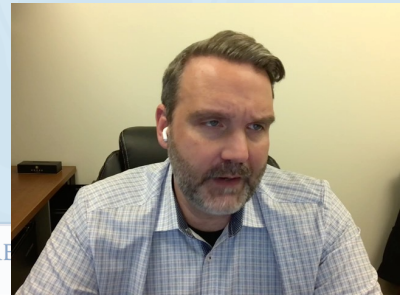
Leadership, Management & Ethics for Medical Physics

1. Ethics
2. General concepts of leadership
3. Essential topics of management for medical physicists
4. Diverse topics (entrepreneurial, research and professional skills)
5. Mock interview exercises



Ethics

- Students assigned at the beginning of the semester nine (9) AAPM/RSNA ethics education modules.
- Students were to complete each module prior to faculty-led discussion session at end of semester.
- Discussion session: personal scenarios presented by faculty
  - "What is the ethical issue raised?"
  - "What would you do / how would you handle this?"
  - Faculty: "This is what I did and how it turned out"
  - Focus on engagement



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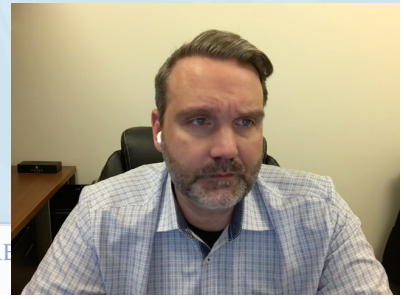
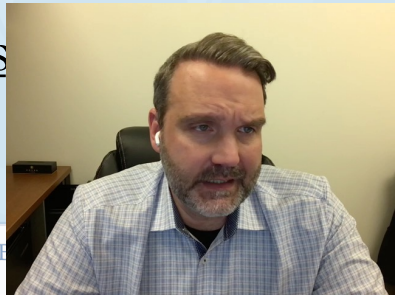


General concepts of leadership; Touchstones

- Understanding the difference between Leadership and Management
  - Management: (coping with complexity) vs. Leadership (coping with change)
  - Leadership styles & values; self-recognition and adaptation to those in your charge

- Concept & application of emotionally intelligent leadership
  - **Primary job of a leader is to be emotionally intelligent about mood**
    - Recognition (self- & social-awareness) and
    - Regulation (self- & relationship-management)

<u>Encourage faculty to volunteer their own experiences</u>



General concepts of leadership; Touchstones

- Motivation and Performance
  - **Expectancy theory of motivation:** an individual will act because they are motivated to select a specific behavior due to perceived result
  - **EPO model: Effort → Performance → Outcome**

- Approaching decision making as a leader
  - As an individual as well as part of a team
  - Improving organizational (*i.e.,* group, division, department) decision-making process
  - Avoiding personal bias in decision making as a team leader
    - **Embracing an "inquiry" versus an "advocacy" approach in a group settin**

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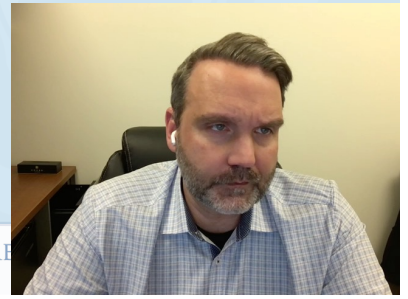
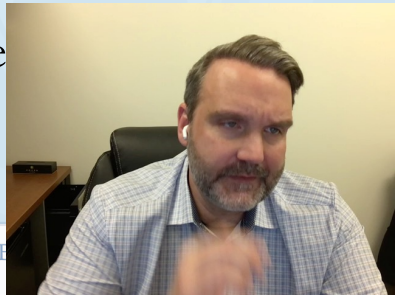


Essential topics in management for Medical Physicists

- Billing & Coding
  - Basic structure of Medicare, reimbursement rates, CPT codes and their "meaning"
  - Changes associated with the alternative payment model
- Staffing models in radiation oncology (and radiology)
  - General concepts and reporting structures (pros and cons)
  - Approaches to staffing (single site, satellites, enterprise, etc.) and examples
  - Where to get your data and guidelines
- Negotiating and understanding contracts
  - The material is presented in two streams: (1) Example of the purchase equipment and (2) analogous steps when pursuing a position …

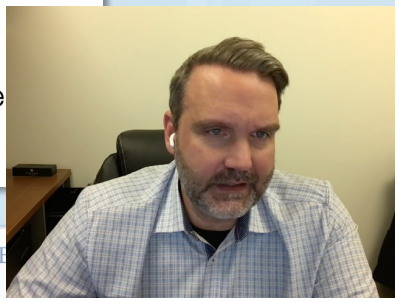


Essential topics in management for Medical Physicists

The process of coming to an agreement …

1. Estimate → Informal chat
2. Request for Quote ("RfQ") → Job responsibilities; posting
3. Quote → 1st offer for employment
4. Negotiation → Counter letter
5. Contract → Final contract
6. Execution of contract → Agreement

*** We will be talking about "capital" or "service" agreements mostly today, but I will make as many paralle
can with employment contracts ***



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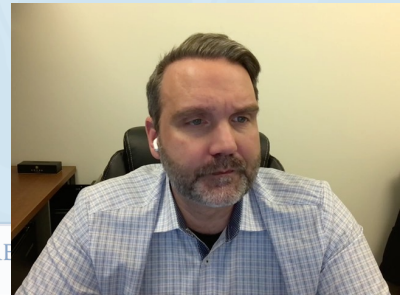

Diverse topics

- Presenting new technologies to administrators
  - Structured planning process for "technology management":
  - Concept of a Life-cycle Cost Analysis (LCCA) to evaluate the economic performance of a piece of equipment over its entire life.
- Technology transfers and patents
  - Definition, types and requirements of patents, intellectual property, NDAs, trademarks.
  - Technology transfers and associated processes
  - Overview of building a Start-up
- "Fielding calls" as a medical physicist
  - From the public, press, lawyers
  - Defining nature of communication and your response
  - How to communicate with general public & patients

Diverse topics

- Interviews and negotiating your first contract
  - Putting together your "packet" (residents and students) (CV preparation, "clinical competency" document)
  - Initial communication with employers
  - Social media & web presence as you move into the professional world
  - Do's and don'ts for interviews
  - Follow-up and crafting a counteroffer
- Financial planning
  - Basic principles of personal financial management and investing
  - Insider trading as it relates to medical physics (scenarios)
- Grants and sources of research funding
  - "How grants work"
  - Overview of funding opportunities for a young investigator
  - Grant management

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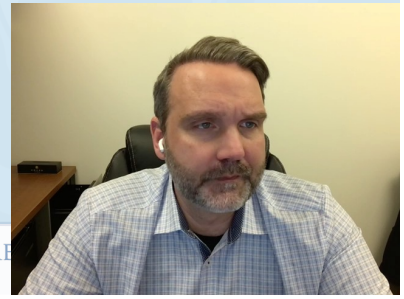
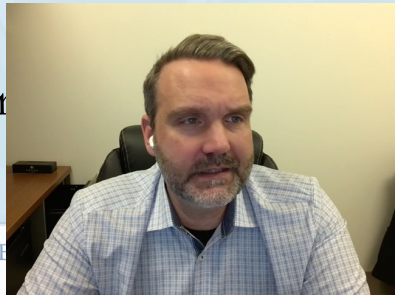


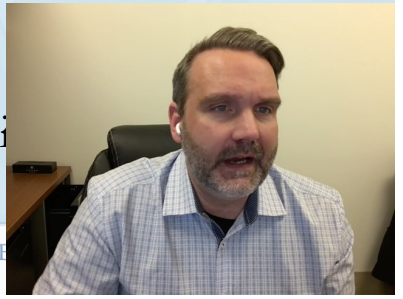
Mock interviews

- We schedule individual (Zoom in this era) interviews with 5-6 faculty over the course of one day with each resident / student.
  - Students: given an ad posting about a residency program
  - Residents: given a generic "blue book" ad posting for a junior faculty or staff medical physicist
- Faculty discuss some basic questions we will ask all interviewees
  - We (I) always ask a tough/unfair question to judge response and force a stress response
    - Ex:, "Do you consider yourself an intelligent person? Why?"
- Faculty members provide feedback per our departmental process that includes:
  - Professional impression
  - Interpersonal / communication skills
  - Overall evaluation (Comments provided)
- One-on-one "debrief" held with each student and resident to discuss inter performance and to provide tips / feedback



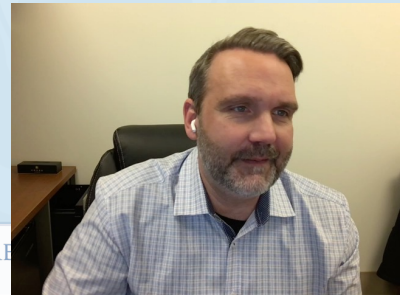
Resident & student feedback

- Generally positive
  - Only have taught the class one semester so sample size limited
- Likes:
  - Interview prep, staffing, negotiating, process of technology planning
  - Personal stories and examples provided by faculty
- Dislikes:
  - Some of the minutia of leadership theory (difficult to frame at current point in career)
    - But do think material will be useful latter on as a reference
- Surprises:
  - "I had no idea about all of this billing stuff. When do you normally learn thi



Thanks

- Ken Holman, PhD MS,
  - Chief of Physics and Residency Director, VUMC
- Robert Rodgers, MS,
  - Chief of Clinical Physics and Deputy Residency Director, VUMC
- John Eley, PhD MS,
  - Director of the Medical Physics Graduate Program, VU
- Adam Yock, PhD,
  - Director of Technology and Innovation in Radiation Oncology, VUMC



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