



AAPM symposium:
Fostering a Successful Career in Research
AAPM 2016

A Research Career in Medical Physics: From Student to Faculty

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In a nutshell

- When there is a knock at the door, answer it.
- Have the passion & creativity for research
- Work hard
- Don't sweat the small stuff
- Play nicely in the sandbox
- Involve your family
- Get involved

Who am I? My Career

- Academic medical physicist
 - the A. N. Pritzker Professor at the University of Chicago
 - Radiology, Medical Physics, and the College
- Research
 - Grant-funded lab - CAD, quantitative image analysis, radiomics
 - Ph.D. students, undergrads, post-docs, senior researchers
- Education
 - Teach in our CAMPEP-accredited Ph.D. program
 - Advise graduate, undergrad, medical students...

Who am I? My Career

- Administration
 - Prior Director, CAMPEP-accredited Ph.D. program
 - Vice-Chair of Radiology for Basic Science Research
 - Chair and/or member of various university committees, etc.
- Member
 - AAPM, RSNA, SPIE, ...
 - National Academy of Engineering
 - Editor-in-Chief, SPIE Journal of Medical Imaging (JMI)
 - Prior President of AAPM
 - Will be the 2017 President-Elect of SPIE

My Life and Medical Physics

- Illinois Benedictine College (1974-1978)
 - Professor Shonka tissue-equivalent plastic (1960's)
 - Professors Spokas and Meeker – started Exradin company making ion chambers for dosimetry (Standard Imaging, Inc.)
 - Exradin Miniature **Shonka** Thimble Chamber



EXRADIN ATSL ION CHAMBER

For relative dosimetry scanning and measuring points in water, air, or other phantom material

My Life and Medical Physics

- Illinois Benedictine College (1974-1978)



- Professor Rose Carney, who had worked on the Manhattan Project
- Professor of Mathematics at IBC
- My advisor & mentor in college
- Many opportunities – teaching HS summer Algebra & at Fermi Lab

My Life and Medical Physics

- Summers at **Fermi National Labs** (1976-1978)

- Drs. Mike Shea and Bob Goodwin – **beam line diagnostics**



“Protons are being accelerated through Linac's nine cavities for the first time at 200 MeV. Here, at the control console, are Robert Goodwin and Mike Shea. (1970)”



“Miguel Awschalom, Lionel Cohen watch final preparation of Fermi Lab's Neutron Therapy Center”

- Dr. Miguel Awschalom – **neutron therapy** center opened in 1976

My Life and Medical Physics

- **University of Exeter, England** (1978-1979)

- Rotary Fellowship
- M.Sc. in physics; advisor Vernon Wynn
- The detection of low frequency rhythms in the electrocardiograms of male and female subjects

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My Life and Medical Physics

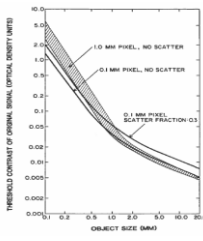
- **The University of Chicago** (1979-1985)

- Ph.D. in medical physics: Basic Imaging Properties in Digital radiography
- Advisor: Kunio Doi – taught me how to do research

$$I_p = \left[\int \int |SS(u,v)|^2 WPF(u,v) du dv \right]^{1/2}$$

and

$$I_s = \left[\frac{\int \int |SS(u,v)|^2 WPF(u,v) [WS(u,v) WPF(u,v)] du dv}{\int \int |SS(u,v)|^2 WPF(u,v) du dv} \right]^{1/2}$$



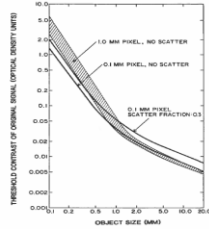
My Life and Medical Physics

- **The University of Chicago (1979-1985)**

- Ph.D. in medical physics: Basic Imaging Properties in Digital radiography
- Advisor: Kunio Doi – taught me how to do research

Additional mentoring from:

- Franca Kuchnir – balancing professional and personal life
- Charles E. Metz – finding the passion and theory behind the research



My Life and Medical Physics

- **The University of Chicago (1986-present)**

- Assistant Professor to A. N. Pritzker Professor (tenured full professor)
- Run a federally-funded research lab on CAD/quantitative radiomics
 - Apply for grants constantly
 - NIH (NCI, NIBIB, NIAMS), DOD, DOE, Whitaker, ACS, ...)
- Involve senior members of lab in the training and supervision of junior members in the lab.
- All are “equal” around the research table and learn to ask probing questions
- Involved in teaching within our CAMPEP-accredited PhD. Program
 - Highly value graduate students
 - Have 4-6 summer students (HS, undergrads) each year
 - Best “payback” - When a student/trainee becomes a colleague!

My Life and Medical Physics

- **The University of Chicago (1986-present)**

- Ask the right questions in the research
 - Connect to the biomedical question
 - Learn from and discuss with program officers at NIH, etc.
 - We are not just doing homework problems
 - Look for “red flags” – there are no answers in the back of the book.

Giger's Involvement in AAPM

- Commission on Accreditation of Medical Physics Training Programs in 1987-1992
- MEDICAL PHYSICS associate editor 1995-2007
- Program committee as co-director of AAPM annual meeting for 1998 and 1999
- Board Member
- Treasurer
- 2008 President-Elect, 2009 President, and 2010 Chair of the Board
- 2016 Radiomics Track Director

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Senior person gave me a break

Lessons Learned

- Your field/job should be your passion, not just a job
- Get involved and you will learn

Hopefully you picked a career so that your job is not a job but a passion.

If you like your job, you won't work a day in your life!

"And to think they pay us to do this!"

Also essential in building a fulfilling career:
Balancing personal and professional life



Also essential in building a fulfilling career:
Balancing personal and professional life



Building a fulfilling career: Balancing personal and professional life

- It is difficult
- It is possible
- It can be enjoyable
- It can be fulfilling
- It can benefit your family, especially your children

Looking Back

(since I don't think I realized all of these 25 years ago!)

- The "SWITCH"
- Work hard
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The "SWITCH"
 - Early mentor told me that her entire post doc salary went to child care. If you don't feel comfortable with who is watching your children, how can you work productively?
 - Be glad when your children want to be with the childcare provider
- Work hard
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The "SWITCH"
- **Work hard**
 - **Sleep?**
 - **Grants are written at night**
 - **School costumes are made at night.**
 - **Multi task**
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

(since I don't think I realized all of these 25 years ago!)

- The "SWITCH"
- Work hard
- **Be creative – in the lab and at home**
 - **Don't be worried about thinking outside of the box**
 - **About making changes**
 - **Keep asking "why?" and "what's next?"**
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The "SWITCH"
- Work hard
- Be creative
- **Don't miss opportunities**
 - **Careful what you say no to; You might not be asked again**
 - **Senior folks – pass a leadership role to a junior person**
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The **"SWITCH"**
- Work hard
- Be creative
- Don't miss opportunities
- **Show that you can get "things" done in an effective and efficient manner**
 - If you want to get something done, give it to a busy person
 - "Just do it" ; "Walk the talk"
 - I tend to be a "behind the scene" person
- Share and be nice
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The **"SWITCH"**
- Work hard
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- **Share and be nice**
 - Everything I learned, I learned in kindergarten
 - Play nice in the sand box; but also stand up for your rights
 - Keep your door "open" for others
- "Pay it forward"
- "Don't sweat the small stuff"

Looking Back

- The **"SWITCH"**
- Work hard
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- **"Pay it forward"**
 - When you mentor/promote a junior person and they say what can they do for you
 - You say – just do the same for some junior person when you are senior
 - Almost everyone in my lab can identify their niche, and ultimately their paper
 - Each takes more pride and ownership in their research
 - The student who does the research gets the first authorship
 - Work gets distributed!
- "Don't sweat the small stuff"

Looking Back

- Work hard
- Be creative
- Don't miss opportunities
- Show that you can get "things" done in an effective and efficient manner
- Share and be nice
- "Pay it forward"
- **"Don't sweat the small stuff"**
 - Don't worry about small set backs; keep moving forward
 - Many problems arise purely from a slight miscommunication
 - Worry less
 - Don't worry about the dust under the couch!
 - It is all about setting priorities

Best Payback

When a student/trainee becomes a colleague!

Family

- Have them understand your job and make them a part of your work life
 - Have them work next to you at home
 - Show them how you work hard & they will learn by example
 - Include them in lab lunches and have lab picnics at your home
 - Bring them to AAPM and other meetings
- Take time off to go to their events
 - Even if you have to drive an hour for an hour-long kindergarten play, and then drive an hour back to work
 - Even if you have to stay up late
 - Be the girl scout leader
 - also when you are in charge, you get to set the schedule!
- Be there for them
