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THE VOICE OF ARTIFICIAL INTELLIGENCE IN MEDICINE

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AI IN MEDICINE PIONEER
EDWARD SHORTLIFFE
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“The most rewarding part of my career has been the creation of novel training programs in biomedical informatics, the recruitment of brilliant and pioneering graduate students, and the creation of a network of productive and influential graduates both in the US and internationally.”

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In an exclusive interview, Edward H. Shortliffe, Adjunct Professor of Biomedical Informatics at Columbia University and Arizona State University, talks artificial intelligence, clinical medicine and jazz.

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Edward H. Shortliffe

Born in Canada, Ted Shortliffe, MD, PhD is Adjunct Professor of Biomedical Informatics at Columbia University's College of Physicians and Surgeons and at the College of Health Solutions at Arizona State University. An early contributor to the field of AI in Medicine, Ted, 72, is also Adjunct Professor of Healthcare Policy and Research at Weill Cornell Medical College and a Senior Executive Consultant to IBM Watson Health.

Photography Laura Stevens





What did you want to be when you were a kid?

My dad was a physician and healthcare administrator so I was interested in a medical career from an early age. I particularly remember being impressed by the annual Christmas Day visit to the hospital. As hospital director, Dad wanted to show his appreciation to those who were working with patients on a holiday, and I would accompany him as he visited the emergency room, hospital wards, and even the surgical areas. People appreciated seeing him and chatting with the 'boss' on the holiday and I got a glimpse of the kinds of people and dedication that characterized the healthcare environment.

Could your career have taken another direction?

I don't remember having any other career goal as I was growing up – and that's why I found myself in a bit of a crisis as a student at Harvard College in 1968 when I discovered computers and initially felt I had to choose between a career in medicine and one in computer science. A Harvard advisor told me about the Laboratory of Computer Science at Massachusetts General Hospital, led by a remarkable physician named Octo Barnett, and I went there to see if I could get a research programming position while I was an undergrad. There I met several physicians who were interested in medical computing, and I realized I did not need to choose between the two fields. The challenge, however, was to find a medical school in 1970 that would allow a medical student to study computing along with the usual med school classes. That was viewed in those days as a very weird thing to want to do!

Who's been the biggest influence on your career?

I have been fortunate to know many remarkable scientists who were both friends and inspirations to me but two stand out. When I arrived at Stanford Medical School, Joshua Lederberg was the Chair of Genetics and a Nobel Laureate (awarded in his early 30s!) and may be the most brilliant person I ever met. He inspired me to believe that I could be a computer-oriented biomedical scientist without ever touching a test tube. He built fruitful collaborations throughout the university, including a key relationship

with Edward Feigenbaum in the Computer Science Department and Carl Djerassi in Chemistry. Together they created the Dendral project – arguably the first influential effort to demonstrate the role of artificial intelligence in support of biomedical science. I was extremely fortunate to be caught up in that environment. It encouraged me to believe that I could be a medical scientist and physician while focusing on computing as both the subject of my work and as a tool in the creation of solutions to important biomedical and clinical problems.

Bruce Buchanan was also a huge influence. He was a philosopher of science as well as a computer scientist, and he became my closest colleague as I pursued my own doctoral research. He advised me on my dissertation work and we had wonderful interactive sessions as we discussed the work and potential solutions to problems that arose. Bruce was a research scientist at Stanford, so he wasn't officially my dissertation advisor, but he was the most involved with the work and my closest confidante as well. We've always stayed in close touch and just last month I spent a long weekend with him at his Orcas Island home.

Professionally, what do you consider your greatest achievement?

My sequential body of work applying artificial intelligence in medicine (the MYCIN project, followed by ONCOCIN and T-Helper) is what defined my career in many respects and is what I am best known for professionally. But I think the most rewarding part of my career has been the creation of novel training programs in biomedical informatics, the recruitment of brilliant and pioneering graduate students, and the creation of a network of productive and influential graduates both in the US and internationally. These students, and the training we offered to them, helped me as we began to define the field of biomedical informatics and embarked on what has become a lifelong educational effort: my textbook of biomedical informatics. That effort began in 1986 and resulted in published editions in 1990, 2000, 2006, and 2014 as the field evolved. The book became much larger over that time, and we are now working on the fifth edition, which will hopefully be published in 2020. ►



What's been your biggest disappointment?

I have been writing pieces calling for biomedical informatics as a crucial element in medical education since at least the 1980s. I believe that 21st century physicians must understand the conceptual basis of the field and not simply know how to do PubMed searches or to use EHRs. Although more and more schools are finally embracing this notion, it has taken much too long. Furthermore, it took too long for schools to introduce academic programs in biomedical informatics, resulting in a dearth of potential faculty members to join medical school faculties and to teach the key courses to health professional students as well as informatics graduate students. Computer science graduates, who have had no exposure to the content and culture of biomedical research and clinical medicine, are poorly prepared to fill these roles. That's why I've tried to stress the importance of individuals who are trained at the intersection of biomedicine with computing and the other component sciences that characterize biomedical informatics, such as decision science, statistics, cognitive science, and management science.

What's your greatest fear?

I fear that too many observers will view AI in medicine, and the biomedical informatics discipline, as being defined solely by the applications that are created. There is still too little understanding of the methodological innovation that is required to move the field forward, and informatics cannot be judged or supported solely on the basis of the applications that have been created and fielded. There is a scientific basis for the field, just as there is basic laboratory science in oncology that leads only over time to the next generation of chemotherapeutic agents.

Greatest challenge overcome?

For someone who has worked in this field since the late 1960s, it is amazing finally to see the broad familiarity and positive acceptance of notions such as biomedical informatics and artificial intelligence. For many years these fields were poorly understood and characterized by overly optimistic expectations.

What would you tell your younger self?

Keep your head down, find joy in important and challenging problems, have fun, and do not focus on career-oriented tactics and whether you will get tenure. Do good work, collaborate well, and mentor others positively. Then career issues will take care of themselves.

What keeps you awake at night?

I am much more worried about the current political and moral/ethical environment than I am about the future of science (except, of course, for threats associated with the anti-science sentiments that are too common in our society). The one exception is climate change, which alas, although highly based on scientific evidence, has become much too bound up in politics.

What's your guiltiest pleasure?

An evening of great music in a New York City jazz club with my spouse and a couple of scotches.

What's the most important lesson life has taught you?

Don't try to plan ahead too much and don't be afraid to try new things, even when there is risk. Things have a tendency to work out if you commit yourself to whatever needs your attention.

Which person do you most admire – and why?

Jazz bassist, composer, and leader: Charles Mingus. He and his music transformed my life.

What's your most treasured possession?

My collection of Bruni Sablan oil portraits of jazz musicians and singers.

If you could edit your past what would you change or do differently

I try not to dwell on 'what ifs', but if I had planned a bit differently I might now have been a part-time emeritus faculty member at one of the universities where I have worked.

My late career movement among institutions (and a three-year stint as President and CEO of our professional society, AMIA) made it impossible to have the kind of sustained appointment at a single institution that is required for moving into emeritus status. I have adjunct appointments today, and maintain opportunities to teach and to mentor both students and faculty, but the university connection is more distant in my semi-retirement than I would have liked.

How do you relax?

Feet up watching the news every evening, with my wife and a drink before we prepare dinner. For longer stints, a beach vacation in Mexico.

What's the most important lesson life has taught you?

No matter how your professional life is going, your happiness and ultimate sense of satisfaction all depend on family.

What's left to conquer?

I'm aiming to phase out of some of my remaining writing/editing/teaching responsibilities over the next two years. If all goes well, I want to write non-academic pieces. Perhaps a novel, or I'm also considering a non-fiction 'lessons learned' book.

Best piece of advice you ever received?

Although I enjoyed clinical medicine and caring for patients, I was advised that my unique contribution would be to focus on my informatics science and the education of others. I took that advice seriously, although I did continue to see patients regularly for 21 years after completing residency.

What advice would you give to someone starting out in a career in medicine/healthcare?

Medicine remains a special and highly rewarding profession. However, current tales of woe related to external administrative pressures and burnout suggest that physicians need to find a way to introduce balance into their professional lives. This doesn't require walking away from a clinical care role, but does suggest that there are ways to identify something else that you are passionate about and to formulate a career that merges the best of both worlds.

Ted Shortliffe will be making a keynote address at AIMed North America, California, Dec 11th-14th 2019 