

PROF. DEV. TRAINING: PYTHON APPLICATIONS FOR DIGITAL DESIGN AND SIGNAL PROCESSING

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PROF. DEV. TRAINING: S/W DEVELOPMENT FOR MEDICAL DEVICE MANUFACTURERS PROF. DEV. TRAINING: ELECTRONIC RELIABILITY TUTORIAL SERIES CO-HOSTED BY ANSYS AND IEEE

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# Potholes and Teenagers: The Rules of Engagement

by Karen Panetta, Reflector Editor

Do you remember when you were a teenager? Unfortunately, I do and quite vividly. As you probably already know, rule number one for teenagers is that teenagers know everything and are experts on everything, especially on topics, for which they have no prior experience. Teenager rule number two is that parents of teenagers know nothing, and the life experiences and wisdom parents possess is not relevant or applicable for teenagers.

I always get asked, "What advice do you wish someone had given you as a teenager, that you know now?" The answer is quite simple. It does not matter what anyone told me or advice they provided. I would have ignored it.

For instance, my father, who worked in the construction industry, once suggested I consider civil engineering as a possible discipline to study in college. I responded with, "No way, I don't want to fill potholes for the rest of my life."

Being a "binary" teenager, which means everything was either a "yes or no" and nothing in between, I had already made up my mind at his suggestion. The answer was "no". There was no need to conduct any further investigation on the matter and the case was closed.

If I could go back in time, I'd give myself a smack up the side of the head for all the great advice I ignored, especially my father's advice to go into business for myself. Today, I would be quite content with a multi-million-dollar contract filling potholes on our roadways. Also, knowing there is never a shortage of potholes in our great state, I would have had tremendous job security.

Now, I realize that I know absolutely nothing, even though I am not yet the parent of a teenager, who will eventually tell me this. This realization has turned out to be a good thing. Why? Because now, I try not to make assumptions, jump to conclusions or rip people's faces off for comments that show how truly clueless and uninformed they are about a topic. I look at every interaction, and attendance at a technical meeting as an opportunity to educate myself, and others and most importantly, to keep innovation brewing.

However, I do still hiss and growl at people who engage in unethical behaviors. Some things I just cannot and do not wish to change.

I have mentored and worked with cohorts of students for over twenty years. They come to me with their dreams and aspirations and I have learned quite a bit from them.

In academic engineering programs, all students are required to do a capstone design project. Some choose their own project concepts, others allow the Professors to choose for them. Over the years, I have seen creativity in overdrive from my students. One thing I have learned is that rule number one applies. They know everything, well almost everything.

The students may not have the exact path carved out on where they are going, but they are confident that they will get there. It is my job to help them do exactly that, even if I don't quite comprehend the value proposition in what they are proposing.

In some cases, colleagues have said, "Why don't you tell the kid what a stupid idea that is?", I always remember the rules. Teenagers know everything and I know nothing. I never tell them they cannot do something or not to bother even trying. I always give them the tools to investigate the options and determine the feasibility for themselves. The proposed projects, where I struggle to understand what customer base on earth would buy the resulting products, are usually the projects that have made my students millionaires.

There is something about young engineers naivety that keeps their perspectives fresh and unbounded. It is truly refreshing.

An IEEE colleague once told me the story of a Venture Capitalist (VC) who saw a thirty second pitch for a start-up company back in the 1980's. The VC said the young entrepreneurs showed him a realistic animation of a person morphing (transforming) into an animal.

The VC's response was "so what?" and made the executive decision not to fund the company.

That company is now known as Pixar. Even today, that VC keeps kicking himself for his poor decision. I have personally exceeded a lifetime limit of poor decision making during my teenage years. So, knowing that teenagers and young adults know almost everything and will most likely ignore advice, which they view as authoritative directives, I always encourage them to make decisions for themselves based on their own investigations and discoveries. I always tell them to never give up on their dream goals and add that I am still working on achieving my own dream goals.

The fact that I still have my own aspirations surprises them. After all, rule number three of teenagers is that anyone over the age of 25 is considered old. At this point in my life, they think I should just climb in the box and close the lid. Young people expect to be successful right now, and not when they are "old".

Thus, all this has reinforced that unless I see imminent danger including ethical issues, my student mentoring approach is to listen, support, advise and most importantly, learn. One of the best ways I have found to arm students with information without stuffing it down their throats is to introduce them to the networks of individuals who know how to nurture good ideas and turn them into successful entrepreneurial ventures and products.

Here in the IEEE Boston Section, we have many groups that are doing just this. One is the Entrepreneurs' Network (www.boston-enet.org) and the other is the Consultants Network

(www.boston-consult.org). These individuals have mastered the art form of knowing how to give young people advice, while making everyone value the advice and use it.

These affinity groups are not only providing resources to help young professionals meet their goals, but are the strongest support network for those of us who aren't quite ready to climb into the box and close the lid on our own innovation dream goals.

To answer the question, "What do I wish I had known back then?" I wish I had known that I didn't know everything and that to be successful, assuming we know nothing can remove all boundaries on innovation.

This is a reprint of previously published editorial

# IEEE Boston Section Online Courses: (Students have 90 day access to all online, self-paced courses)

## **Verilog101:Verilog Foundations**

Full course description and registration at , http://ieeeboston.org/verilog-101-verilog-foundations-online-course/

# System Verilog 101: Design Constructs

Full course description and registration at , http://ieeeboston.org/systemverilog-101-sv101-design-constructs-online-course/

## **System Verilog 102: Verification Constructs**

Full course description and registration at , http://ieeeboston.org/systemverilog-102-sv102-verification-constructs-online-course/

## **High Performance Project Management**

Full course description and registration at , http://ieeeboston.org/high-performance-project-management-online-course/

## Introduction to Embedded Linux Part I

Full course description and registration at , http://ieeeboston.org/introduction-to-embedded-linux-part-i-el201-online-course/

# **Embedded Linux Optimization - Tools and Techniques**

Full course description and registration at , http://ieeeboston.org/embedded-linux-optimization-tools-techniques-line-course/

## Embedded Linux Board Support Packages and Device Drivers

Full course description and registration at , http://ieeeboston.org/embedded-linux-bsps-device-drivers-line-course/

# **Software Development for Medical Device Manufacturers**

Full course description and registration at , http://ieeeboston.org/software-development-medical-device-manufacturers-line-course/

## **Fundamental Mathematics Concepts Relating to Electromagnetics**

Full course description and registration at , http://ieeeboston.org/fundamental-mathematics-concepts-relating-electromagnetics-line-course/

# **Reliability Engineering for the Business World**

Full course description and registration at , http://ieeeboston.org/reliability-engineering-business-world-line-course/

## **Design Thinking for Today's Technical Work**

http://ieeeboston.org/design-thinking-technical-work-line-course/

## **Fundamentals of Real-Time Operating Systems**

http://ieeeboston.org/fundamentals-of-real-time-operating-systems-rt201-on-line-course/

Entrepreneurs' Network – 7:00PM, Tuesday, October 6 EDT

# **Knowing Your Competition to Set Your Startup Apart**

Location: Webinar

Register Here: https://boston-enet.org/event-3892643/Registration

# (Please note capacity is limited so pre-registration is necessary)

For the founder and entrepreneur launching a startup company, it is important understand the market for your products or services, and to understand your competition when you enter that market.

When you are seeking angel or VC investment or trying to recruit co-founders and first employees or contractors, all will be looking for your competitive analysis and how from your knowledge of the market, you can set your startup apart, including the following:

• Knowledge and mastery of the place your company's products or services fill in your target marketplace;

• What market niche you intend to enter and can dominate

• Your plan for how your company will penetrate the target

• Identity of your chief competitors, both direct competitors and indirect competitors that could be substitutes for your product or service

• The value proposition that you offer that will enable you to overcome the normal tendency for no change

• Strengths of the competition and your plan to overcome those

• Weakness of your competitors and your plan to avoid those same weaknesses

• Barriers to entry you would seek to create to surmount new competition once you gain market traction

Let us hear from three deeply experienced panelists, one of whom is an angel investor, two are entrepreneurs and all three deeply involved in product or service marketing in tech, life science and consumer fields, who will share their knowledge and experience with the ENET audience for this webinar on the critical issue of market mastery, competitive analysis and how to use those to set your company apart. There is much to learn in this important area for your startup to achieve traction and success.

#### Agenda:

7:00 - 7:10 PM - ENET Chairperson's announcements 7:10 - 7:25 PM – eMinute Pitch - Up to 3 Startup companies' presentations

7:25 - 8:10 PM - 3 expert speakers on the night's topic 8:10 - 8:45 PM – Moderator and Audience Q and A to the speakers

(all times are USA Eastern Daylight time)

Register Here: https://bit.ly/ENET2915w

Speakers:



Praveen Tailam, Entrepreneur, Investor & Advisor

Praveen Tailam is an entrepreneur, investor, start-up advisor, conference speaker, mentor, and philanthropist with strong connections to TiE. As the trustee of the TiE Global board he handles all aspects of running the organization to help foster entrepreneurship thru it's chapters,

programs and events. TiE Global is an organization that oversees the growth and support of TiE chapters worldwide. Praveen is knowledgeable about trends in business and technology and passionate about strengthening the entrepreneurial ecosystem. For six years until December 2017, he was the managing director who oversaw the operation of TiE Angels. Praveen continues to serve as an investor, mentor, start-up advisor, entrepreneur and business plan competition judge at various universities and incubators. He engages frequently with investors and industry experts on how to best place intellectual and investment capital. Through his ties with universities and incubators, he offers help and support to promising young entrepreneurs. Additionally, Praveen co-manages multiple dental practices in New Hampshire and Maine in partnership with Aspen Dental, a leading nationwide Dental Service Organization. Praveen founded Redtail Consulting, a Boston area IT consulting practice, in 2006 and managed the business through 2012, and has managed enterprise scale messaging systems for companies in the technology, banking, and insurance sectors, including IBM, Putnam Investments and Wellpoint BCBS. Praveen holds a Masters Degree in Information Systems from Northeastern University and a Bachelor's Degree in Mechanical Engineering from Osmania University. https://www.linkedin.com/in/praveen-tailam-3b1521/



Alisa de Gaspe Beaubien, Chief Operations Officer @ Groupize, a company she and her husband co-founded. They developed software for people to manage events, meetings, weddings, sporting tournaments and more. Groupize evolved into an online place where corporate travel planners can easily book

10 or more hotel rooms for meetings—and Groupize's technology makes the experience smoother for participants. Prior to Groupsize, Alicia was Vice President @ DuVine Cycling + Adventure Co., from 2005 to 2013, a company that designs and leads luxury bike trips in the world's most amazing places – from the rolling hills of Tuscany and storied medieval villages of Provence to the Andean foothills of Argentina's wine country and the lush vineyards of Sonoma. Prior to that she was vice President @ Yankee Holidays 1994 to 2004, She is a graduate of Endicott College, with Bachelor of Science degree in Hotel, Motel, and Restaurant Management.

https://www.linkedin.com/in/alisa-de-gaspe-beaubien-0002973/



David Uffer, Partner @ Alira Health.

The company is an International advisory firm offering integrated strategy, innovation and execution services, and dedicated to healthcare in areas of pharma, life sciences, med tech, diagnostics and HIT. Prior to Alira, from 2013 to 2017, David was Director, Business Development

& Licensing @ Covidien (Medtronic Minimally Invasive Therapies Group), where he worked in the areas of M&A, licensing, distribution, co-development, equity investments, pipeline development. In the prior period 1990 to 2013, David held a series of senior management and marketing positions with the following different well-known life science companies: Hologic, Inc., Bovie Medical Corporation, Integra LifeSciences, Boston Scientific, Abbott Diagnostics (Abbott Laboratories). He holds a B.A. degree from Clark University in International Relations, and an MBA degree from Thunderbird School of Global Management.

https://www.linkedin.com/in/david-uffer-00a176/

#### Moderator



Robert A. Adelson, Principal, Business and Tax attorney, Adelson & Associates, LLC. Chair Emeritus, Boston Entrepreneurs' Network (ENET).

Rob has been an attorney for over 30 years specialized in business, tax, stock and options, employment, contracts, financing, trademarks and intellectual

property. Rob began as an associate at major New York City law firms before returning home to Boston in 1985 where he has since been a partner in small and medium sized firms before joining Engel & Schultz LLP where he was a partner from 2004 to 2019. When the senior partners retired, he moved his law practice to his own firm. Rob represents entrepreneurs, start-ups and small companies, independent contractors and employees and executives. Rob is a frequent speaker on business law topics and author of numerous articles published in Boston Business Journal, Mass High Tech and other publications, plus more than twenty articles since 2016 on executive employment topics published by CEOWorld magazine. He has been named among the "Top 20 Boston Startup Lawyers" by ChubbyBrain. com, a website that provides tools for entrepreneurs. Rob has been on the ENET Board since 2002, was Vice Chair 2005-2009, and ENET Chairman 2009-2019. He was also a Co-Founder and Board member of the 128 Innovation Capital Group (2004 -2015). In 2016, he received the IEEE USA Professional Achievement award for "extreme dedication to the entrepreneurship community." He holds degrees from Boston University, B.A., summa cum laude, Northwestern University (Chicago), J.D., Law Review, and New York University, LL.M. in Taxation.

https://www.linkedin.com/in/robert-adelson-b8a1557/

Reliability Society, NE-ESDA, iMAPS New England – 7:00PM, Wednesday, October 14

# The Customer Is Always Right!



The NE ESDA Chapter, in conjunction with IEEE Boston Reliability and iMAPS New England offer this webinar to share real life examples of improving reliability based on listening to what the customer says and/or wants.

A one-hour webinar on increasing reliability based on listening to what the customer says and/or wants.

The information presented will include many situations and comes from 35 years of working with customers and fixing problems because we did not listen to the customers in the first place.

The general topics are:

• Perception is very important to the customer, even in absence of reality. Example of a customer who was using a machine to melt gold and silver to manufacture jewelry. He observed much better results when he pressed a switch to engage the new, novel pressure-over-pouring routine. There was just one major inaccuracy with his observations...but he refused to see it.

• A car with a mind of its own. In this case, the customer contacted the car manufacturer since the car seemed to have a fit when the customer bought a certain product from the store.

• Very safe, redundant system for a reconnaissance military aircraft. Everyone was elated with the system, including the customer...all except the pilot who was very skeptical. Turns out, the pilot was right, and all the engineers were wrong...

• Engineering improvements to create a much better display in military fighter jet. Took 36 man-months to implement with anti-aliasing and other improvements. The pilot's response was priceless... and unexpected.

• A flare and chaff counter on an aircraft was a bit overzealous, obviously from switch/relay contact bounce. The simple engineering fix made matters worse...



• A jewelry casting machine that took a short break, without warning, from work at 0900 and 1500 everyday, even though there was no clock in the machine.

• A military aircraft designed to land on aircraft carriers would work perfectly on land but would

show its nervousness when landing at sea on an aircraft carrier. A simple design review would have eliminated the nervousness.

Jay Skolnik, PE, CPI, CPM of Skolnik Technical Training. Jay is a licensed professional electrical engineer and is the co-founder and lead engineer/ consultant of Skolnik Technical Training in Albuquerque, NM. With over thirty years of experience in the electronics industry, Jay has developed a multitude of products utilized in different industries, including military, defense, avionics, aerospace, commercial, industrial, medical, automotive, and sports entertainment.

As an ESDA certified p rogram manager, J ay teaches ESD mitigation and control for the electronics and energetics specialties. He performs ESD audits to ensure factories and laboratories are following safe ESD control guidelines and procedures. He is also certified by iNARTE and is a certified professional instructor of national instruments (NI). He received his electrical engineering degree from the University of Missouri-Rolla. Email: engr@skolnik-tech.com

#### **Registration:**

#### https://events.vtools.ieee.org/m/241424.

Opens Wednesday, September 30th at 12PM (Noon) and closes on Tuesday, October 13th at 12PM (Noon).

Power & Energy Society – 6:30PM EDT, Tuesday, October 20

# Global Electric Power Sector: Engaging with Environmental Issues

Speaker: Saifur Rahman, PhD, Joseph Loring Professor & Director, Advanced Research Institute, Virginia Tech

Location: Online only via MS Teams; no in-person gathering



China, US, India, Japan and Russia are the top five countries in terms of electricity generation capacity. Between them they had a total capacity of 3,650 million kW in 2016. In terms of fuel sources for electricity coal, natural gas, hydro, nuclear, renewables and oil provided 38.3%, 22.9%, 16.3%, 10.2%, 9% and 3.3% respectively in 2017. This means

almost two-thirds of the global electricity production came from fossil fuels in that year. This is reflected in about 10 billion tons of CO2 from electricity generation or about a third of the global production. However, this mix is expected to change significantly in the next 10 years. By 2030 installed power generation capacities from wind, solar PV, hydro power, nuclear and thermal are going to reach 540 GW, 420 GW, 530 GW, 160 GW and 1200 GW respectively. The top five CO2 emitting countries are: China, United States, India, Russian Federation and Japan each producing between nine and one billion metric tons of CO2 in 2016. However, CO2 is not the only concern against global warming.

The Global Warming Potentials (GWP) of greenhouse gases are as follows: CO2 (1), Methane (28), Hydro fluorocarbons (138), Nitrous oxide (265), Per fluorocarbons (6,630) and Sulphur hexafluoride (23,500). So, the bottom line is: Efforts in the electric power sector to replace fossil fuel with renewables and nuclear will help. But if emission from the transportation sector continues to rise, the drop in power sector contributions will not be enough. Large scale Electric Vehicle deployment will help, but question remains – how will the EV be powered.

Professor Saifur Rahman is the founding director of the Advanced Research Institute at Virginia Tech, USA where he is the Joseph R. Loring professor of electrical and computer engineering. He also directs the Center for Energy and the Global Environment He is a Life Fellow of the IEEE and an IEEE Millennium Medal winner. He was the President of the IEEE Power and Energy Society (PES) for 2018 and 2019. He was also the founding editor-in-chief of both the IEEE Electrification Magazine and the IEEE Transactions on Sustainable Energy. In 2006 he served on the IEEE Board of Directors as the vice president for publications. He is member-at-large of the IEEE-USA Energy Policy Committee. He is a distinguished lecturer for the IEEE Power & Energy Society and has lectured on renewable energy, energy efficiency, smart grid, electric power system operation and planning, etc. in over 30 countries. He served as the chair of the US National Science Foundation Advisory Committee for International Science and Engineering from 2010 to 2013. He has conducted several energy efficiency related projects for Duke Energy, Tokyo Electric Power Company, the US Department of Defense, the State of Virginia and the US Department of Energy.

#### **TEAMS** details:

Join Microsoft Teams Meeting, Tuesday, October 20th, 2020; MS Teams starts at 6:30pm

Free and Open to the Public; RSVP is appreciated Visit the IEEE PES Boston Chapter website for further details - http://www.ieeepesboston.org/

If you have any questions, please contact Amsa (781-446-3676) or Subhadarshi (781-907-2483)

Entrepreneurs' Network – 7:00PM, Tuesday, October 20 EDT

# **Developing a Business Model for Your Startup**

Location: Webinar

#### Register: https://boston-enet.org/event-3892647 (Please note capacity is limited, so pre-registration is necessary)

It's been said that the success of a startup is 99% execution and 1% the idea. What are the components of execution? Clearly, you need to create the product/service, but you also need to implement the business side. That involves developing a business model that defines how your company will operate in terms of hiring, finance and legal setup, marketing and sales, operations, and customer care. You test your assumptions with data, make your choices, implement and then launch!

Developing a business model for your startup deserves much thought. We have assembled a panel of entrepreneurs and experts to share their experience and insights with us on this topic. Come join us!

Agenda:

7:00 - 7:10 PM - ENET Chairperson's announcements 7:10 - 7:25 PM - eMinute Pitch - Up to 3 Startup companies' presentations

7:25 - 8:10 PM - 3 expert speakers on the night's topic 8:10 - 8:45 PM – Moderator and Audience Q & A with the speakers

(all times are USA Eastern Daylight time)

A question and answer session will follow the panel discussion, and panelists will be available afterward for responses to individual questions.

#### **Panel Members**

#### Ameeta Soni, CMO



Ameeta has been working with technology startups in many roles - marketer, founder, consultant, investor, board member, and advisor. She cofounded fitness app provider FitTrace and founded PLM software company Aanza, RFID technology services company Aanza AutoID Group, and management consulting firm Altek Consult-

ing. She serves on the Maroon Venture Partners Fund's investment committee and is a board observer/advisor for several of its portfolio companies. Ameeta served as Chief Marketing Officer at digital media company PlatformQ Health and VFA, a SaaS and tech-enabled services provider acquired by a PE-backed company. She is past chair of the MIT Enterprise Forum of Cambridge and a Charter Member of TiE Boston. Ameeta is a mentor at Techstars, LearnLaunch, and Springboard accelerators. She received her MBA from the University of Chicago.

https://www.linkedin.com/in/ameetasoni

Albine Martin, Ph.D., EIR at Johns Hopkins University &



**Biohealth Innovation** Dr. Albine Martin brings over 20 years of operating and product commercialization experience within 3 three public companies representing the biotechnology, diagnostics and life sciences sector. Currently she holds roles as Entrepreneur in Residence at Johns Hopkins University and Biohealth Innovation with the goal of

translating research technologies to market. Dr Martin provides translational leadership to advance academic intellectual property and secure bridge funding via Maryland Innovation Funds and angel investors. She has served as COO of Precision Biologics, (a clinical stage oncology company with a Companion Diagnostic) where she formulated a virtual business model and negotiated agreements to advance towards Phase 2 clinical trials. She has served as a sector expert and member with Active Angels, and New Dominion Angels where she led diligence and syndicated investments. Dr. Martin holds a PhD from the University of Maryland, College Park.

https://www.linkedin.com/in/albine-martin-ph-d-9a2315/

Alex Cowan, Batten Fellow & General Faculty, University of Virginia Darden School of Business

Alex is on the faculty of UVA Darden where he teaches courses on product design and digital development. Online @Coursera, he's delivered over 300,000 courses. Before teaching, Alex started and sold two companies and he continues to advise and invest in digital ventures. He was founder and CTO of Leonid Systems, which was acquired by BroadSoft, now a part of Cisco. At COWAN+, Alex helps corporations develop better products and improve the work of innovation teams. His Venture Design framework is widely used by practitioners and instructors for new product and venture creation. Alex studied industrial engineering and economics at Stanford University.

https://www.linkedin.com/in/alexcowan/

Moderator:



Millie Kwan, Founder and President, The WSI Touch (https://thewsitouch. com)

Millie is Founder and President of The WSI Touch, a digital marketing agency that has been serving small to mediumsized businesses in Greater Boston since 2009. She has over 20 years' experience in IT development, manage-

ment, education and research. She received her Doctor of Business Administration degree from Boston University and M.S. in Computer Science from Washington University in St Louis. She has taught at Babson College, University of Hong Kong and Boston University and published research on knowledge management, process redesign and workflow management. In her early career, she specialized in library automation and has led the implementation of various library systems for the University of Rhode Island, the HELIN Library Consortium of Rhode Island, and Washington University in St Louis. Millie is also Chair of Boston ENET. https://linkedin.com/in/milliekwan

#### Organizer

Roger Frechette, Ph.D., Founder and Principal, NE-PAssociates

My daily purpose is to exercise an innate drive to transform ideas and projects into life-changing commercial assets. In the life science business, this is the long game, requiring boundless energy and creativity, coupled with knowledge, experience, and patience.

In my consulting work, I leverage an extensive global network and insights derived from >20 years of experience in business development, calibrated with an extensive science background. My career has encompassed success as a business executive, project/alliance manager and entrepreneur, and also as a scientist, including leadership of discovery/preclinical development teams resulting in a new drug candidate – Paratek Pharmaceuticals NDA's for NUZYRA and SEYSARA NDA's were approved in 2018.

https://www.linkedin.com/in/rogerfrechette/

# **Call for Articles**

Now that the Reflector is all electronic, we are expanding the content of the publication. One of the new features we will be adding are technical, professional development, and general interest articles to our members and the local technology community. These will supplement the existing material already in our publication.

Technical submissions should be of reasonable technical depth and include graphics and, if needed, any supporting files. The length is flexible; however, a four to five page limit should be used as a guide. An appropriate guide may be a technical paper in a conference proceeding rather than one in an IEEE journal or transaction.

Professional development or general interest articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or payment is required. A maximum length of two to three pages would be best.

To ensure quality, technical submissions will be reviewed by the appropriate technical area(s). Professional/interest articles will be reviewed by the Publications Committee for suitability. The author will be notified of the reviewers' decision.

The Reflector is published the first of each month. The target submission deadline for the articles should be five weeks before the issue date (e.g., June 1st issue date; article submission is April 27). This will allow sufficient time for a thorough review and notification to the author.

We are excited about this new feature and hope you are eager to participate! Submissions should be sent to; ieeebostonsection@gmail.com Computer, Reliability Societies, and GBC/ACM, 7:00PM, Thursday, October 22

**Rebuilding After Covid-19** 

MIT Prof. Alex (Sandy) Pentland

#### Register in advance for this webinar at https://acm-org.zoom.us/webinar/register/WN\_ J8-uTmdOTkqibUB256E\_fw

After registering, you will receive a confirmation email containing information about joining the webinar.



The pandemic has destroyed much of the world economy, and laid bare many failures in our health, finance, law, and government systems. Digital technologies can help us rebuild by enabling more resilient, effective, secure, and inclusive systems. In this talk I will discuss what world leaders,

multilateral organizations (World Bank, OECD, UN, etc) and industry are discussing, and how IEEE and ACM members can contribute to these digital initiatives and help them to achieve the best possible outcomes.

Professor Alex 'Sandy' Pentland directs MIT Connection Science, an MIT-wide initiative, and previously helped create and direct the MIT Media Lab and the Media Lab Asia in India. He is one of the most-cited computational scientists in the world, and Forbes recently declared him one of the "7 most powerful data scientists in the world" along with Google founders and the Chief Technical Officer of the United States. He is on the Board of the UN Foundations' Global Partnership for Sustainable Development Data, co-led the World Economic Forum discussion in Davos that led to the EU privacy regulation GDPR, and was central in forging the transparency and accountability mechanisms in the UN's Sustainable Development Goals. He has received numerous awards and prizes such as the McKinsey Award from Harvard Business Review, the 40th Anniversary of the Internet from DARPA, and the Brandeis Award for work in privacy.

He is a member of advisory boards for the UN Secretary General and the UN Foundation, and the American Bar Association, and previously for Google, AT&T, and Nissan. He is a serial entrepreneur who has co-founded more than a dozen companies including social enterprises such as the Harvard-ODI-MIT DataPop Alliance. He is a member of the U.S. National Academy of Engineering and leader within the World Economic Forum. You can read more about Sandy at,

https://www.media.mit.edu/people/sandy/overview/ and https://en.wikipedia.org/wiki/Alex\_Pentland.

This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be online only due to the COVID-19 lockdown.

Up-to-date information about this and other talks is available online at http://ewh.ieee.org/r1/boston/computer/. You can sign up to receive updated status information about this talk and informational emails about future talks at http://mailman.mit.edu/mailman/listinfo/ ieee-cs, our self-administered mailing list.

# **IEEE Boston Section Social Media Links:**

Twitter: https://twitter.com/ieeeboston

Facebook: https://www.facebook.com/IEEEBoston

YouTube: https://www.youtube.com/user/IEEEBostonSection

LinkedIn: https://www.linkedin.com/groups/IEEE-Boston-Section-3763694/about



# Consumer Technology Society Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Consumer Technology (CT-S), Boston Chapter. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local CT-S member needs. The Boston Section is organizing chapters into groups of similar technical interest areas to pool their resources for easier and better chapter collaboration in planning the chapter events.

If you have interest in volunteering for a chapter leadership position or are interested in learning more about what these volunteer positions may entail, please send an email to Karen Safina in the IEEE Boston Section office at, k.safina@ieee.org.

Dennis Shapiro, Past Chair, IEEE Boston Consumer Technology Chapter

# **Call for Articles**

Now that the Reflector is all electronic, we are expanding the content of the publication. One of the new features we will be adding are technical, professional development, and general interest articles to our members and the local technology community. These will supplement the existing material already in our publication.

Technical submissions should be of reasonable technical depth and include graphics and, if needed, any supporting files. The length is flexible; however, a four to five page limit should be used as a guide. An appropriate guide may be a technical paper in a conference proceeding rather than one in an IEEE journal or transaction.

Professional development or general interest articles should have broad applicability to the engineering community and should not explicitly promote services for which a fee or payment is

required. A maximum length of two to three pages would be best.

To ensure quality, technical submissions will be reviewed by the appropriate technical area(s). Professional/interest articles will be reviewed by the Publications Committee for suitability. The author will be notified of the reviewers' decision.

The Reflector is published the first of each month. The target submission deadline for the articles should be five weeks before the issue date (e.g., June 1st issue date; article submission is April 27). This will allow sufficient time for a thorough review and notification to the author.

We are excited about this new feature and hope you are eager to participate! Submissions should be sent to; ieeebostonsection@gmail.com

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Advertising with the IEEE Boston Section affords you access to a highly educated, highly skilled and valuable consumer. Whether you are looking to reach students with a bright future and active minds, or whether you are reaching households with priorities that may include a family, planning for vacations, retirement, or like-values, the IEEE Boston Section is fortunate to enjoy a consistent relationship. The IEEE Boston Section provides education, career enhancement, and training programs throughout the year. Our members, and consumers, are looking for valuable connections with companies that provide outstanding products. For qualified advertisers, the IEEE Boston Section advertising options are very flexible. Through our affiliate, we will even help you design, develop, and host your ads for maximum efficiency. A few important features of the IEEE Boston Section

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# **Call for Course Speakers/Organizers**

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. The IEEE Boston Section, its dedicated volunteers, and over 8,500 members are committed to fulfilling this core purpose to the local technology community through chapter meetings, conferences, continuing education short courses, and professional and educational activities.

Twice each year a committee of local IEEE volunteers meet to consider course topics for its continuing education program. This committee is comprised of practicing engineers in various technical disciplines. In an effort to expand these course topics for our members and the local technical community at large, the committee is publicizing this CALL FOR COURSE SPEAKERS AND ORGANIZERS.

The Boston Section is one of the largest and most technically divers sections of the IEEE. We have over 20 active chapters and affinity groups.

If you have an expertise that you feel might be of interest to our members, please submit that to our online course proposal form on the section's website (www.ieeeboston.org) and click on the course proposal link (direct course proposal form link is

http://ieeeboston.org/course-proposals/ . Alternatively, you may contact the IEEE Boston Section office at ieeebostonsection@gmail.com or 781 245 5405.

- Honoraria can be considered for course lecturers
- Applications oriented, practical focused courses are best (all courses should help attendees expand their knowledge based and help them do their job better after completing a course
- Courses should be no more than 2 full days, or 18 hours for a multi-evening course
- Your course will be publicized to over 10,000 local engineers
- You will be providing a valuable service to your profession
- Previous lecturers include: Dr. Eli Brookner, Dr. Steven Best, Colin Brench, to name a few.

# **IEEE Boston Section Social Media Links:**

Twitter: https://twitter.com/ieeeboston

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# Electronic Reliability Tutorial Series (co-hosted by IEEE Boston Section and Ansys Coproration)

Web-based Course with live Instructor!

(12 total hours of instruction!)

Times & Dates: Each session starts at 11:00 ET November 2, 3, 9, 10, 16, 17 & 18

Speakers: Greg Caswell, Dock Brown, Ansys

#### **Series Overview:**

Electronics perform critical functions in every major industry vertical, whether in automotive, aerospace, consumer, medical or industrial segments. With the advent of newer technologies (both at the component and material levels), shrinkage of feature sizes, more stringent environments and sophisticated power requirements, electronics face increasing reliability risks. The cost of reliability assurance activities is often a fraction of the cost of failure, with compounding benefits from conducting these activities early in the design process.

This set of five tutorials is aimed at organizations in every industry vertical, who would like to mitigate electronic failures.

Learn how to mitigate electronic reliability risks and prevent failures from industry renowned and award-winning experts.

#### Benefits of attending the series:

- Understand common failure mechanisms at the electronic component/ package level and the printed circuit board assembly level
- Learn about actionable mitigation methods for relevant failure modes/mechanisms
- How to conduct reliability assessment for electronics
- How to conduct a five-step design activity assurance for electronics
- Electrostatic Discharge (ESD) failures and how to mitigate them
- The Importance of Printed Circuit Board Cleanliness: How to Prevent No Fault Found Failures

#### **Series Tutorial Session Ttiles**

You can view detail session descriptions once you click on the individual sessions once you access the main series webite. See the link at the end of the course notice.

1. Thermally Induced Failures and Reliability Risks created by Advancements in Electronic Technologies (1day, 2 hours)

2. A Methodology for Understanding the Reliability of Electronic Packaging (1 day, 2 hours)

*3. Electronic Reliability 360: How to Verify Design Robustness Early in the Process (2 days, 1.5 hours hours each)* 

4. Electrostatic Discharge (ESD) for Electronics– What is it? Where Does it Come From? And How do You Obviate ESD Failures? (2 days, 1.5 hours each)

5. Contamination and Cleanliness Issues in Printed Circuit Board Assemblies (1 day, 2 hours)

#### **Speaker Bios:**



Greg Caswell, a Lead Consulting Engineer for Ansys Corporation, is an industry recognized expert in the fields of SMT, advanced packaging, printed board fabrication, circuit card assembly, and bonding solutions using nanotechnology. He has been well-regarded as a leader in the electronics contract manufacturing and component packaging industries for the past 50 years. He has presented over 270 papers at conferences all over the world and has taught courses at IMAPS, SMTA and IPC events. He helped design the 1st pick and place system used exclusively for SMT in 1978, edited and co-authored the 1st book on SMT in 1984 for ISHM and built the 1st SMT electronics launched into space. Be on the lookout for his new book entitled Design for Excellence in Electronics



Manufacturing due out in September 2020. Greg has won several awards including the IMAPS Lifetime Achievement Award in 2018, the ISHM Daniel C. Hughes Award (highest award given to an individual), ISHM Fellow of the Society Award and the Tracor Technical Innovation Award.

Dock Brown brings his more than 30 years of electronics reliability experience to clients of Ansys. Prior to joining Ansys, he spent 20 years at Medtronic where he most recently concentrated on cross business unit implementation of reliability initiatives for Class III medical devices. He was also responsible for supplier assessment and approval, on-going supplier audits, failure analysis, corrective actions, MRB, sampling, and ultimately full accountability for quality and reliability of COTS and custom parts and assemblies from a worldwide supplier base. Earlier in his career, Mr. Brown also spent time at Sundstrand Data Control where he led the implementation of the Boeing AQS program and with Olin Aerospace. As a volunteer, he has been involved with ASQ, IEEE, IPC, and SMTA. He was the keynote speaker at the SMTA Cleaning Conference. He has taught design for reliability, tin whiskers, statistics, design of experiments, and contributed to standards development. He has won the SMTA Distinguished Speaker award and the SMTA Microelectronics Conference Best Paper award.

Individual tutorial/session abstract, goals, benefits of attending, target audience can be found by clicking on the title of each tutorial/session once the main series site is accessed (see below)

Upon entering the registration page, you will have the option of registering for one or more tutorials/ sessions. We offer a 15% discount for 2-3 tutorials and 25% discount for 4-5 tutorials. You will be able to choose your tutorials/sessions from the registration page.

#### Decision (Run/Cancel) Date for this Course is Monday, October 26, 2020

2 hour sessions IEEE Members \$80 Non-members \$100

3 hour sessions IEEE Members \$120 Non-members \$150

## http://ieeeboston.org/electronic-reliability/

# Software Development for Medical Device Manufacturers

Web-based Course with live Instructor!

(12.5 hours of instruction!)

Times & Dates: 1:00 - 4:PM EDT; October 19, 20, 21, 22

Speaker: Steve Rakitin

This course will be presented with a live instructor using web-meeting software. The course content will be covered in 4 sessions presented over four days.

#### **COURSE SUMMARY**

Developing software in compliance with the FDA Design Control regulation, changing FDA guidance documents and latest international standards is challenging. This intensive course provides practical solutions and suggestions for developing software in a manner that meets applicable FDA regulations, guidance documents and international standards, such as IEC-62304:2015. The focus is on interpreting Design Controls for software. Each section of the Design Controls regulation (820.30) is discussed from the perspective of software development. Discussions on key topics such as Software Requirements, Traceability, Design Reviews, Software Verification & Validation and Risk Management (including recently updated standards ISO-14971:2019 and EN-14971:2019) are included. Also discussed are FDA requirements for validation of software development tools and software used in Manufacturing and Quality Systems. Also discussed are recent FDA Guidance Documents on Cybersecurity, Mobile Apps, and Usability.

#### THIS COURSE IS INTENDED FOR...

Software engineers, project managers, quality managers, software quality professionals, RA/QA staff, and anyone who needs to develop cost-effective processes and procedures that will enable their organizations to deliver high quality software-based medical devices that comply with FDA regulations and international standards. This course is also appropriate for people who are new to the medical device industry.

#### **COURSE MATERIAL**

Course notes, access to an extensive collection of reference documents and a training certificate will be provided.

#### COURSE OUTLINE

This course will be presented with a live instructor using web-meeting software. The course content will be covered in 4 sessions as described below. Please note that duration of each session may slightly change depending on the number of questions posed to the instructor.

#### AGENDA

SESSION 1 – Regulatory Context Duration ~3 hours with one 15 min break This session will cover key regulatory requirements for medical device software in the US and EU.

Regulations and Guidance:

• FDA Medical Device Regulation (21 CFR Part 820 – specifically, design controls)

- EU Medical Device Regulation
- FDA Guidance Documents:

o Guidance for Content of Pre-market Submissions for Medical Devices Containing Software

- o Off-the-Shelf Software Use in Medical Devices
- o General Principles of Software Validation

o Content of Premarket Submissions for Management of Cybersecurity in Medical Devices

o Policy for Software Device Functions and Mobile Medical Applications

o Applying Human Factors and Usability Engineering to Medical Devices

• International Standards:

o ISO 13485:2016 Medical Devices – Quality Management Systems

- o IEC 62304: 2015 Medical Device Software Software Lifecycle Processes
- o ISO 14971: 2019 Application of Risk Management to Medical Devices
- o EN 14971: 2019 Application of Risk Management to Medical Devices
- Off-the-Shelf (OTS) Software and Open Source software (SOUP)
- Discussion: All Software Is Defective...

SESSION 2 – FDA Design Controls and IEC 62304 – Part 1 Duration ~2.5 hours with one 15 min break

This session will cover FDA Design Controls and IEC 62304 requirements for medical device software.

- Design and Development Planning
- o How does Agile Development fit?
- o Medical Device Software Lifecycle Processes
- Risk Management
- o FDA Levels of Concern
- o IEC 62304 Software Safety Classification
- Software Requirements
- o Techniques for Removing Ambiguity from Requirements
- Software Architecture and Design
- Software Design Changes

SESSION 3 – FDA Design Controls and IEC 62304 – Part 2 Duration ~2.5 hours with one 15 min break

This session will cover Software Verification and Validation requirements.

- Software Implementation
- Software Verification
- o Technical Reviews
- o Static Analysis
- o Unit and Integration Testing
- System Testing
- Software Validation Testing

SESSION 4 – Software Tool Validation and Risk Management Duration ~2.5 hours with one 15 min break

This session will cover Software Tool Validation and Risk Management requirements.

Software Tool Validation

- o Deciding which tools need to be validated
- o Validation approach for software tools
- Validation of Manufacturing Software and Quality System Software
- Risk Management Using Fault Tree Analysis (FTA)
- o Review of ISO/EN 14971:2019 Requirements

o Example of Fault Tree Analysis and Failure Modes Effect Criticality Analysis (FMECA)

Course Cancellation and Refund Policy: Requests for online course cancellations must be received 3 business days prior to the course date for a full refund. Once course materials have been shared with a participant, a cancellation request cannot be accommodated.

#### About the instructor...

Steven R. Rakitin has over 40 years experience as a software engineer and software quality manager. He helped write the first IEEE Software Engineering Standard (IEEE-STD-730 Standard for Software Quality Assurance Plans) and worked on revisions to both IEEE Standard 1012-2012 (Software Verification & Validation) and IEEE 730-2014 (Software Quality Assurance). He has written several papers on software quality as well as a book titled: Software Verification & Validation for Practitioners and Managers. He received a BSEE from Northeastern University and an MSCS from Rensselaer Polytechnic Institute. He earned certifications from the American Society for Quality (ASQ) as a Software Quality Engineer (CSQE) and Quality Auditor (CQA). He is a Senior Life Member of the IEEE. As President of Software Quality Consulting, he helps medical device companies comply with FDA regulations, guidance documents, and international standards in an efficient and cost-effective manner.

Decision (Run/Cancel) Date for this Course is Monday, October 12, 2020

IEEE Members \$285 Non-members \$345

# Python Applications for Digital Design and Signal Processing

(12 hours of instruction!)

Time & Dates: Thursdays – Oct. 1, 8, 15, 22 and Tuesdays, Oct. 6, 13, 20, 27 – 6:30PM – 8:00PM ET

Location: Live, Interactive, Webinar

Speaker: Dan Boschen

**Course Summary:** This is a hands-on course in the popular and powerful open source Python programming language.

Dan provides simple, straight-forward navigation through the multiple configurations and options, providing a best-practices approach for quickly getting up to speed using Python for solving signal processing challenges. Students will be using the Anaconda distribution, which combines Python with the most popular data science applications, and the Jupyter Notebooks for a rich, interactive experience.

The course begins with basic Python data structures and constructs, including key "Pythonic" concepts, followed by an overview and use of popular packages for scientific computing enabling rapid prototyping for system design.

Once a basic working knowledge of the language is established, students will create example designs including a sigma delta converter and direct digital synthesizer both in floating point and fixed point. This will include considerations for cycle and bit accurate models useful for digital design verification (FPGA/ASIC), while bringing forward the signal processing tools for frequency and time domain analysis.

Jupyter Notebooks: This course makes extensive use of Jupyter Notebooks which combines running Python code with interactive plots and graphics for a rich user experience. Jupyter Notebooks is an open-source webbased application (that can be run locally) that allows users to create and share visually appealing documents containing code, graphics, visualizations and interactive plots. Students will be able to interact with the notebook contents and use "take-it-with-you" results for future applications in signal processing. **Target Audience:** This course is targeted toward users with little to no prior experience in Python, however familiarity with other modern programming languages and an exposure to object-oriented constructs is very helpful. Students should be comfortable with basic signal processing concepts in the frequency and time domain. Familiarity in Matlab or Octave is not required, but the equivalent operations in Python using the NumPy package will be provided for those students that do currently use Matlab and/or Octave for signal processing applications.



**Benefits of Attending/Goals of Course:** Attendees will gain an overall appreciation of using Python and quickly get up to speed in best practice use of Python and related tools specific to modeling and simulation for signal processing analysis and design.

#### A laptop (Mac or PC) preconfigured with Anaconda is required; the specific installation instructions will be emailed to students prior to the start of class.

**Biography:** Dan Boschen has a MS in Communications and Signal Processing from Northeastern University, with over 25 years of experience in system and hardware design for radio transceivers and modems. He has held various positions at Signal Technologies, MITRE, Airvana and Hittite Microwave designing and developing transceiver hardware from baseband to antenna for wireless communications systems. Dan is cur-

## Python for Verification



rently at Microchip (formerly Microsemi and Symmetricom) leading design efforts for advanced frequency and time solutions.

For more background information, please view Dan's Linked-In page. https://www.linkedin.com/in/danboschen

# All Classes 6:30pm-8:00pm Eastern Time on the dates listed below

#### Thursday, October 1 and Tuesday, October 6

Topic 1: Intro to Jupyter Notebooks, the Spyder IDE and the course design examples including Delta Sigma Converters, GPS Code Generators, and Numerically Controlled Oscillators. Core Python constructs.

### 2<sup>nd</sup> Order Delta Sigma DAC



<u>Thursday, October 8 and Tuesday, October 13</u> Topic 2: Core Python constructs, functions, reading writing data files.

<u>Thursday, October 15 and Tuesday, October 20</u> Topic 3: Signal processing simulation with popular packages including NumPy, SciPy, and Matplotlib.

<u>Thursday. October 22 and Tuesday. October 27</u> Topic 4: Bit/cycle accurate modelling and analysis using the design examples and simulation packages

Decision (Run/Cancel) Date for this Course is Monday, Septmebr 28, 2020

IEEE Members	\$190
Non-members	\$210

http://ieeeboston.org/%20python-for-signal-processing/



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