BOSTON

THE REFLECTOR

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Advancing Technology for Humanity

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Importance of Reflection

by Denise Griffin, Past Chair, IEEE Boston Section

Around this time of year there is a lot of traffic in and around the Boston area – and a lot of it has to do with parents coming from all over to see their children graduate from one of the many amazing colleges and universities that the Boston area is fortunate to be home to. I was one of those parents sitting in traffic yesterday as we drove to watch my son graduate from college on what thankfully ended up being a really nice, sunny day. We spent the whole day just being so proud of him and everything he has accomplished, smiling for pictures, listening to great speeches, and sharing a lot of special moments with friends and family.   It was a very special day. For our family it was truly a day of reflection….

It's so easy to get caught up in the day to day projects, deadlines, meetings and events that make up our work, and focus on everything we need to do in order to get to the finish line. It's really easy to - as soon as we finish one project - to just jump right into working on the next one and start worrying about all the things that will happen if we don't finish it on time. This happens when we are students, and doesn't really seem to stop once you are working full time. I suppose you could say it's a sign of good work ethic - that we are such responsible students/employees, and can be counted on to get the job done, and that doing all these things will help us to always meet our deadlines and achieve our goals.

But do we give ourselves enough credit for what we have done? Or take the time to even reach out to a work colleague/teammate and let them know how well he or she has done?

What if we made more of an effort, more often than just on the big events such as college graduation, take the time to stop and reflect on what we have done so far. There are so many intermediate milestones that we hit along the way that support us getting to our eventual goals. But we need to take the time to stop and think about them, celebrate them, reflect on them – not just what we could have done better, but what about "what went RIGHT?" I bet there are a lot of things that are worth being very proud of and worth taking note of!

In the card to my son, one of the things I wrote was for him to remember that life isn't about a destination, but it is about the journey, and I asked him to try to remember to stop and enjoy the ride. I think we all need to think about doing that in our own lives, but on a more frequent basis.

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, ieeebostonsection@gmail.com

Aakash Deliwala, Chair, IEEE Boston Consumer Technology Chapter

Engineering in Medicine & Biology Society
Call for Volunteers!

We are currently looking for volunteers who would be interested in pushing forward the mission of the Engineering in Medicine & Biology Society (EMBS), Boston Chapter. The EMBS - Boston Chapter was recently approved in July 2021, and we're looking to make a significant impact in the area of Biomedicine, Bioengineering, and Biotechnology in the region. The chapter is looking for volunteers to help organize chapter meetings and help meet the needs of the local EMBS members.

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, ieeebostonsection@gmail.com.

Aseem Singh, Marie Tupaj, Co-Chairs, Boston EMBS Chapter

IEEE Boston Section Online Courses:
(Students have 180 day access to all online, self-paced courses)

Electronic Reliability Tutorial Series
Full course description and registration at ,
http://ieeeboston.org/electronic-reliability/

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/

2024
IEEE INTERNATIONAL SYMPOSIUM ON PHASED ARRAY SYSTEMS AND TECHNOLOGY

15 – 18 October 2024 - Hynes Convention Center, Boston, MA USA

About the Symposium

Phased array systems continue to be a rapidly evolving technology with steady advances motivated by the challenges presented to modern military and commercial applications. This symposium will present the most recent advances in phased array technology and present a unique opportunity for members of the international community to interact with colleagues in the field of Phased Array Systems.and Technology.

13 May 2024 – full paper submission deadline
Submission Site: https://cmt3.research.microsoft.com/ARRAY2024/

IEEE-ARRAY.org

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 Video Series

A collaborative discussion panel featuring esteemed members from the Institute of Electrical and Electronics Engineers has convened in 2021 to produce educational video presentations that embrace IEEE's mission of advancing technology for humanity.

Among the programs they've produced include "Electric Vehicles: Fun Saving Our Planet", "Greener Power For More Electric Vehicles", "Overcoming Nuclear Fears To Achieve Net Zero CO2 By 2050" and "Achieving a Net Zero Carbon Future", "Green Energy's Economic Progress", and "Net-Zero CO2 with Nuclear, Hydrogen and Geothermal". Projects currently in production include the expansive topic of futurology, with a focus on increasing the efficiency and transformation of aging electrical power generating stations and infrastructure to accommodate nuclear power; reviewing the viability of alternative energy (such as geothermal, wind and solar); and focusing on 'cleaner' fossil fuels that are more environmentally-friendly to slow the rate of climate change.

These shows are produced and directed by Lennart E. Long, IEEE Senior Life Member from the Executive Committee and Past Chair of the Boston Section; Dr. Paul H Carr, BS, MS, MIT; PhD Brandeis U, IEEE Life Fellow; Dr. Ted Kochanski, SB (MIT), Ph.D (U.Texas, Austin), IEEE Global Education for Microelectronic Systems and former Boston Section Chair; and Dr. Ken Laker, B.E. (Manhattan College), M.S. and Ph.D. (New York University), IEEE Life Fellow and past President of IEEE.

The panel is moderated by five-time Boston/New England Emmy Award-winner and television personality and star of "The Folklorist," John Horrigan. These video programs with presentations and discussions can be accessed at the IEEE Boston Section video portal at https://vimeo.com/user18608275.

We are looking for any IEEE members that would like to appear on the program in the role of presenter or discussion expert. Simply reach out to Robert Alongi at the Boston Section at, ieeebostonsection@gmail.com.

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**

**27th Annual
IEEE High Performance Extreme Computing Virtual Conference
25 - 29 September 2023**

CALL FOR PAPERS

Chair & SIAM Liaison
Dr. Jeremy Kepner
Fellow, MIT Lincoln Laboratory

Senior Advisory Board Chair
Mr. Robert Bond
CTO, MIT Lincoln Laboratory

Technical Chair
Dr. Albert Reuther
MIT Lincoln Laboratory

Senior Advisory Board
Prof. Anant Agarwal
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Mr. John Goodhue
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Dr. Bernadette Johnson
Chief Venture Technologist
MIT Lincoln Laboratory

Dr. Richard Linderman,
ASDR&E

Mr. David Martinez
Associate Division Head
MIT Lincoln Laboratory

Dr. John Reynders
Vice President
Alexion Pharmaceuticals

Dr. Michael Stonebraker
Co-founder SciDB and Vertica;
CTO VoltDB and Paradigm4

Publicity Chair
Mr. Dan Campbell, GTRI

CFP Co-Chairs
Dr. Patrick Dreher, NCSU
Dr. Franz Franchetti, CMU

Publications Chair
Prof. Miriam Leeser
Northeastern University

Administrative Contact
Mr. Robert Alongi
IEEE Boston Section

The IEEE High Performance Extreme Computing Conference (HPEC '23) will be held virtually 25 – 29 September 2023. The HPEC charter is to be the premier conference in the world on the confluence of HPC and Embedded Computing.

The technical committee seeks new presentations that clearly describe advances in high performance extreme computing technologies, emphasizing one or more of the following topics:

- AI / Machine Learning
- Graph Analytics & Network Science
- Advanced Multicore Software Technologies
- Advanced Processor Architectures
- Automated Design Tools
- Big Data & Distributed Computing
- Big Data Meets Big Compute
- Case Studies & Benchmarking of Applications
- Cloud HPEC
- Computing Technologies for Challenging Form Factors
- ASIC & FPGA Advances
- Quantum and Non-Deterministic Computing
- Data Intensive Computing
- Digital Front Ends
- Fault-Tolerant Computing
- Embedded Cloud Computing
- General Purpose GPU Computing
- High Performance Data Analysis
- Interactive and Real-Time Supercomputing
- Mapping & Scheduling of Parallel & Real-Time Applications
- New Application Frontiers
- Open System Architectures
- Cyber Analysis and Secure Computing

HPEC accepts two types of submissions:	**IMPORTANT DATES**:
1. Full papers (up to 6 pages, references not included. Additional pages can be purchased for $200/page). 2. Extended abstracts (up to 2 pages, references included).	Submission Deadline: **JUL 07, 2023** Notification of Acceptance: **AUG 15, 2023** Camera Ready Deadline: **AUG 31, 2023**

Submissions to HPEC '23 will be accepted through the CMT submission site at:
https://cmt3.research.microsoft.com/HPEC2023/

Preference will be given to papers with strong, quantitative results, demonstrating novel approaches or describing high quality prototypes. Authors of full papers can mark their preference for a poster display or an oral presentation. Presenters who wish to have hardware demonstrations are encouraged to mark their preference for a poster display. Accepted extended abstracts will be displayed as posters.   Papers can be declared "student paper" if the first author was a student when doing the presented work and will be eligible for the "IEEE HPEC Best Student Paper Award." Papers should not be anonymized. All paper and extended abstract submissions need to use the approved IEEE templates. Full paper submissions with the highest peer review ratings will be published by IEEE in the official HPEC proceedings and may be available on IEEE eXplore. All other accepted submissions and extended abstracts are published on ieee-hpec.org.

Vendors are encouraged to sign up for vendor booths. This will allow vendors to present their HPEC technologies in an interactive atmosphere suitable for product demonstration and promotion. We welcome input (hpec@ieee-hpec.org) on tutorials, invited talks, special sessions, peer reviewed presentations, and vendor demos. Instructions for submitting will be posted on the conference web site shortly.

IEEE-HPEC.org

Entrepreneurs' Network – 7:00PM, Tuesday, June 6

Reach Your Prospects Before They're Ready to Buy

Location: Science and Technology Center, Lasell University, Newton, MA

Attendees will have the option to join us in-person at Lasell University, Newton, MA or online via Zoom.

Most of your prospects determine who they'll buy from before they even contact you. Buyers go to the web and search or seek recommendations from word-of-mouth. Sellers of products or services should become publishers of content appropriate for their audiences and distribute it widely.

A panel of marketing communication professionals will help you understand what to share and where so that prospects, prospective employees, and/or investors find you. Among the topics to be discussed are social media platforms, search engine optimization and marketing, PR, and how AI can be applied to email marketing. You will learn when to make or outsource (copywriting, multimedia, podcasts, etc.) based on your existing material, your capabilities, and budget.

Event Schedule
7:00 PM ET – Introduction - ENET Chairperson's announcements
7:10 PM ET - eMinute Pitch - Up to 3 Startup pitches
7:25 PM ET - Expert Panel - 4 expert speakers on the night's topic
8:10 PM ET - Q & A - Moderator and Audience Q & A with the speakers
8:30 PM ET – Networking - Panelists will be available afterward for responses to individual questions.
Additional information and registration: https://bostonenet.org/events/reach-your-prospects-before-they-re-ready-to-buy/

Speakers

Mark O'Toole – Consultant
Mark works with businesses to establish their rallying cries, improve their storytelling, and explore technologies and channels to best share company stories. A gold medal award winner from the Content Marketing Institute for his team's viral SlideShare about looking for your first job out of college, Mark believes a strong story coupled with exploration of content distribution is under-utilized by businesses. A lifelong Massachusetts native, Mark has experience across PR and marketing disciplines. He works with technology brands, especially in robotics and automation, and cleantech and medtech businesses among others. Mark is also deeply immersed in Greater Boston's cultural and tourism industry, serving as chair of the board for the iconic Freedom Trail.

Brittany Di Capua - Founder, The Boston Food Journal
Brittany started The Boston Food Journal in late 2015. With a degree in biomedical engineering and a background in software, she wanted to create a platform that combined her skills and experience in technology with her long-time love of food. When she moved to Boston in 2014, she was enamored by the authentic food scene and on a complete whim started The Boston Food Journal. In late 2019, Brittany resigned from working the corporate 9-5 to pursue the Boston Food Journal and launch her boutique digital marketing agency, Eleven Seven Media. At Eleven Seven Media, Brittany and her team craft custom digital strategies for clients across multiple verticals, leveraging both creative expertise and analytical insights.

Angela Pitter - CEO, LiveWire Collaborative
Angela Pitter is the founder and CEO of LiveWire Collaborative, a digital marketing consultancy. We collaborate with clients to build comprehensive solutions that help them find their target communities and convert them into customers. Our superpower is helping business owners understand how their digital footprint shows up for their customers and clients and where it isn't showing up so they can close the gaps and find the people who need their help most.

LiveWire Collaborative offers various services, including Online Strategy Development and Implementation

for mid-size businesses, Social Media Analysis, Facebook Ads, and Email Marketing. Additionally, LiveWire Collaborative specializes in social media training for corporations and organizations, both onsite and virtual.

Previously featured on the TV series Chronicle, WCVB, Angela is a highly sought-after speaker who has personally trained thousands of CEOs, business owners, and consultants worldwide on her signature LinkedIn Influencer framework. She is the recipient of numerous awards and was recently recognized by the Charles River Regional Chamber of Commerce and GetKonnected as one of the Top 50 Most Influential Business People of Color.

She is a certified Project Management Professional (PMP) and holds both her M.S. in Administration and B.S. in Computer Engineering from Boston University. Angela currently serves on the Board of Directors for the Charles River Regional Chamber of Commerce.

Moderator & Organizer

Howard Sholkin - VP, ENET
Howard Sholkin has several decades of marketing communication experience across industry sectors. Since 2018, he has served as President of Newton Community Pride, a non-profit supporting a few dozen events in the city where he is a lifelong resident. In 2014, he formed Sholkin Consulting to deliver digital marketing services to technology and financial services companies. He also served on the adjunct faculty of Boston University and Lasell College for five years.

In 2003, he was hired as director of corporate communications at International Data Group (IDG) where he served Founder Pat McGovern. Sholkin later became director of communication and marketing programs for the CEO of IDG Communications, a global technology media and events subsidiary. IDG brands include Computerworld, PCWorld, Macworld, and CIO. Sholkin has held senior marketing and communication positions at technology product and services companies such as Computervision; Technology Concepts, a subsidiary of Bell Atlantic; Corporate Software; and, Digital Equipment Corp./Compaq. He was a columnist for PR News and for Personal Branding magazine, one of the first publications on social media.

Since 1990, Sholkin has been active in the Public Relations Society of America (PRSA) where he once served as president of the Boston chapter.

Currently, he is co-chair of the national PRSA Investment Committee. He serves on the boards of three non-profits: Newton Community Pride, Boston Entrepreneurs Network (ENET) and Temple Shalom of Newton.

Entrepreneurs' Network – 7:00PM, Tuesday, June 20

Preparing for a Successful Exit

Location: CIC, One Broadway, Cambridge, MA

Event Schedule
7:00 PM ET – Introduction - ENET Chairperson's announcements
7:10 PM ET - eMinute Pitch - Up to 3 Startup pitches
7:25 PM ET - Expert Panel - 4 expert speakers on the night's topic
8:10 PM ET - Q & A - Moderator and Audience Q & A with the speakers
8:30 PM ET – Networking - Panelists will be available afterward for responses to individual questions.
Additional information and registration will be posted soon at: https://bostonenet.org/events/preparing-for-a-successful-exit/

Computer Society and GBC/ACM – 6:30PM, Wednesday, June 7

Securing Global DNA Synthesis Without Disclosing Information Hazards

Speaker: Kevin Esvelt

Location: MIT Room 32-G449 (Kiva) and online via Zoom

Please register in advance for this seminar even if you plan to attend in person at https://acm-org.zoom.us/webinar/register/1416829920200/WN_5PoH3W-WnRgSS6cImHyr6yQ

After registering, you will receive a confirmation email containing information about joining the webinar. Indicate on the registration form if you plan to attend in person. This will help us determine whether the room is close to reaching capacity.

We may make some auxiliary material such as slides and access to the recording available after the seminar to people who have registered.

Printing custom DNA sequences is essential to scientific and biomedical research, but the technology can be used to build plagues as well as cures. Just as ink printers recognize and reject attempts to counterfeit money, DNA synthesizers and assemblers should deny requests to make viral DNA that could be used to ignite another pandemic. There are three complications. First, we don't need to update printers to deal with newly discovered currencies, whereas we'll constantly learn of new viruses and other biological threats. Second, anti-counterfeiting specifications on a local printer can't be extracted and used to help terrorists – unlike DNA blueprints for hazards. Third, a list of all the DNA orders placed by a biotech company could paint a detailed portrait of its R&D program, so any screening system must protect the privacy of each customer's orders as reliably as their banks safeguards their finances. Cryptography, the foundation of modern computer security, can do the same for synthesis screening. We will discuss SecureDNA, an internationally developed and fully automated system capable of securely screening all DNA synthesis that will be made freely available by the end of 2023.

Kevin Esvelt is Associate Professor of Media Arts and Sciences, NEC Career Development Professor of Computer and Communications and director of the Sculpting Evolution group at the MIT Media Lab. His group invents new ways to study and influence the evolution of ecosystems.

He received his Ph.D. from Harvard University for inventing a synthetic microbial ecosystem to rapidly evolve useful biomolecules, and subsequently helped pioneer the development of CRISPR, a powerful new method of genome engineering.

In 2013, Esvelt was the first to identify the potential for CRISPR "gene drive" systems to alter wild populations of organisms. Recognizing the implications of an advance that could enable individual scientists to alter the shared environment, he and his colleagues chose to break with scientific tradition by revealing their findings and calling for open discussion and safeguards before building the first CRISPR-based gene drive system and demonstrating reversibility in the laboratory.

An outspoken advocate of sharing research plans to accelerate discovery and improve safety, Esvelt's MIT lab seeks to accelerate beneficial advances while safeguarding biotechnology against mistrust and misuse. Projects include building catalytic platforms for directed evolution, pioneering new ways of developing ecotechnologies with the guidance of local communities, developing early-warning systems to reliably detect any catastrophic biological threat, applying cryptographic methods to enable secure and universal DNA synthesis screening, and advising policymakers on how best to mitigate global catastrophic biorisks.

His work has been published in Nature and Science, covered by the New York Times and Washington Post, and featured on Last Week Tonight and the Netflix special Unnatural Selection.

This joint meeting of the Boston Chapter of the IEEE Computer Society and GBC/ACM will be hybrid (in person and online), part of getting back to normal after the COVID-19 lockdown.

Up-to-date information about this and other talks is available online at https://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 https://mailman.mit.edu/mailman/listinfo/ieee-cs, our self-administered mailing list.

Call for Course Speakers/Organizers

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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.
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- 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.

Robotics & Automation Society and Aerospace and Electronic Systems Society - 6:00PM, Thursday, June 15

Building Better Bots with Bayes: Probabilistic Human-Machine Reasoning for Collaborative

Location: 550 Huntington Avenue, Boston, MA 02115. Building: Beatty Hall. Room Number: 426

Registration:
https://events.vtools.ieee.org/m/360942

From the development of foundational state space estimation tools like the Kalman filter to state of the art machine learning techniques for sensor fusion and decision making, probabilistic models and reasoning algorithms are the "lingua franca" for modern robotics and autonomous systems. The COHRINT Lab at CU develops and leverages probabilistic AI in new and unique ways to tackle fundamental research questions for current and futuristic systems. Dr. Nisar Ahmed will highlight his lab's recent work on human-machine/robot interaction for collaborative information gathering and reasoning, using probabilistic Bayesian state estimation and decision-making algorithms.

These methods not only plug in seamlessly to existing autonomy architectures, but also exploit the ability of human collaborators to provide semantic data (via user-friendly interfaces) that is rich with useful "out of band" information for autonomous platforms. In essence, these methods open the door to "soft re-programming" of autonomous reasoning from the outside by end-users (who are not robotics experts or computer scientists). Aerospace applications such as integrated UAS surveillance/reconnaissance, UAS-enabled wilderness search and rescue, and remote robotic space exploration will be demonstrated and discussed.

Dr. Nisar Ahmed is an Associate Professor and H.J. Smead Faculty Fellow in the Smead Aerospace Engineering Sciences Department at the University of Colorado Boulder. He is a member of the Research and Engineering Center for Unmanned Vehicles (RECUV) and directs the Cooperative Human-Robot Intelligence (COHRINT) Lab. He received his B.S. in Engineering from Cooper Union in 2006, his Ph.D. in Mechanical Engineering from Cornell University in 2012 through an NSF Graduate Research Fellowship, and he was a postdoctoral research associate in the Cornell Autonomous Systems Lab from 2012 to 2014. He was awarded the 2011 AIAA Guidance, Navigation, and Control Conference Best Paper Award; an ASEE Air Force Summer Faculty Fellowship in 2014; and the 2018 Aerospace Control and Guidance Systems Committee (ACGSC) Dave Ward Memorial Lecture Award. His work has been supported by the Army, Air Force, DARPA, Navy, NASA, Space Force, and multiple industry sponsors. He has organized several international workshops and symposia on autonomous robotics, sensor fusion, and human-machine interaction. He is a Member of the IEEE and the AIAA Intelligent Systems Technical Committee, and he is the CU Site Director of the NSF IUCRC Center for Aerial Autonomy, Mobility, and Sensing (CAAMS).

Magnetics Society – 11:00AM, Thursday, June 22

Atomic Scale Imaging of Magnetic Circular Dichroism, Chemistry and Structure of Magnetic Oxides

Speaker - Xiaoyan Zhong - TRACE EM Unit and Department of Materials Science and Engineering, City University of Hong Kong, Hong Kong SAR, P. R. China

The atomic-level knowledge of local spin configuration of magnetic materials is of great importance to predict and control their physical properties. However, it is highly challenging to experimentally characterize magnetic properties of such materials with atomic scale spatial resolution. One of the best options to push the spatial resolution of magnetic imaging lies in the electron energy-loss magnetic chiral dichroism [1], which is also called electron magnetic circular dichroism (EMCD). Physically, X-ray magnetic circular dichroism (XMCD) and EMCD share the same underlying physics in which the angular momentum transferred during X-ray absorption or inelastic electron scattering can selectively excite magnetic sublevels in atoms. The structured electron beams generated through interference of suitably phased plane waves can produce beams with orbital angular momentum. Electron beams can be easily focused compared with X-rays, allowing for atomic scale magnetism to be probed. Previously, we have found a strong EMCD signal in transition metal oxides allowing them to use standing wave methods to identify the different spin states of Fe atoms with site specificity [2].

In principle EMCD can offer higher spatial resolution and greater depth sensitivity due to the short de Broglie wavelength and penetration of high-energy electrons compared to XMCD. Recently by using EMCD and achromatic electron microscopy, we are able to access the magnetic circular dichroism with atomic plane resolution [3]. Combining with advanced capability of structural and chemical imaging by using aberration-corrected transmission electron microscopy, all the information including magnetic polarization, atomic configurations and chemical states can be simultaneously accessed from the very same sample region. In the examples of complex oxides e.g. Sr_2FeMoO_6 [3], nanocomposite $Sr_2Fe_{1+x}Re_{1-x}O_6$ [4] and antiphase boundary of $NiFe_2O_4$ [5], we would like to show how to achieve atomic scale magnetic, chemical and structural information and understand the structure-property relationship of these magnetic materials at the atomic level.

Dr. Xiaoyan Zhong is currently an associate Professor in the Department of Materials Science and Engineering at City University of Hong Kong. He received his B.S. degree in Materials Science and Engineering in 2001 and PhD degree in Materials Science and Engineering in 2007 at Tsinghua University. After three-year postdoctoral research at Argonne National Laboratory in USA, he began his independent academic career as assistant professor and associate professor at Tsinghua University from 2010 to 2020. He joined Department of Materials Science and Engineering at City University of Hong Kong since May 2020. His current research interests involve methodology development of transmission electron microscopy and spectroscopy and their application in solving new challenges in magnetic materials. Recently Zhong's group has developed the quantitative atomic-plane resolved electron magnetic circular dichroism method and pushed spatial resolution of magnetic circular dichroism into atomic level by achromatic electron microscopy, which was published in the peer-reviewed journals such as Nature Materials, Nature Communications and Advanced Functional Materials. He received "Ten Major Scientific and Technological Progress of China's Colleges and Universities" awarded by Ministry of Education of the People's Republic of China and the Excellent Young Scholar

References
[1] Schattschneider, P., et al., Detection of magnetic circular dichroism using a transmission electron microscope. Nature, 2006, 441, 486-488.
[2] Wang, Z.Q., et al., Quantitative experimental determination of site-specific magnetic structures by transmitted electrons. Nature Communications, 2013, 4, 1395.
[3] Wang, Z.C., et al., Atomic scale imaging of magnetic circular dichroism by achromatic electron microscopy. Nature Materials, 2018, 17, 221-225.
[4] Ho, P.-L., et al., Effect of cation ratio and order on magnetic circular dichroism in the double perovskite $Sr_2Fe_{1+x}Re_{1-x}O_6$. Ultramicroscopy, 2018. 193. 137-142.
[5] Li, Z., et al., Atomic Structure and Electron Magnetic Circular Dichroism of Individual Rock Salt Structure Antiphase Boundaries in Spinel Ferrites. Advanced Functional Materials, 2021, 31, 2008306.

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.

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**

Introduction to Neural Networks and Deep Learning (Part I)

Web-based Course with live Instructor!

Times & Dates: 9AM - 12:30PM ET, Saturday, October 21, 2023

Speaker: CL Kim

Course Format: Live Webinar, 3.5 hours of instruction!

Series Overview: Neural networks and deep learning currently provides the best solutions to many problems in image recognition, speech recognition, and natural language processing."

Reference book: "Neural Networks and Deep Learning" by Michael Nielsen, http://neuralnetworksanddeeplearning.com/

This Part 1 and the planned Part 2, (to be confirmed) series of courses will teach many of the core concepts behind neural networks and deep learning.

More from the book introduction: We'll learn the core principles behind neural networks and deep learning by attacking a concrete problem: the problem of teaching a computer to recognize hand-written digits. …it can be solved pretty well using a simple neural network, with just a few tens of lines of code, and no special libraries."

"But you don't need to be a professional programmer."

The code provided is in Python, which even if you don't program in Python, should be easy to understand with just a little effort.

Benefits of attending the series:
* Learn the core principles behind neural networks and deep learning.
* See a simple Python program that solves a concrete problem: teaching a computer to recognize a handwritten digit.
* Improve the result through incorporating more and more core ideas about neural networks and deep learning.
* Understand the theory, with worked-out proofs of fundamental equations of backpropagation for those interested.
* Run straightforward Python demo code example.

The demo Python program (updated from version provided in the book) can be downloaded from the speaker's GitHub account. The demo program is run in a Docker container that runs on your Mac, Windows, or Linux personal computer; we plan to provide instructions on doing that in advance of the class.

(That would be one good reason to register early if you plan to attend, in order that you can receive the straightforward instructions and leave yourself with plenty of time to prepare the Git and Docker software that are widely used among software professionals.)

Course Background and Content: This is a live instructor-led introductory course on Neural Networks and Deep Learning. It is planned to be a two-part series of courses. The first course is complete by itself and covers a feedforward neural network (but not convolutional neural network in Part 1). It will be a pre-requisite for the planned Part 2 second course. The class material is mostly from the highly-regarded and free online book "Neural Networks and Deep Learning" by Michael Nielsen, plus additional material such as some proofs of fundamental equations not provided in the book.

Outline:
Feedforward Neural Networks.
* Simple (Python) Network to classify a handwritten digit
* Learning with Stochastic Gradient Descent
* How the backpropagation algorithm works
* Improving the way neural networks learn:
    ** Cross-entropy cost function
    ** Softmax activation function and log-likelihood cost function
    ** Rectified Linear Unit
    ** Overfitting and Regularization:
        *** L2 regularization
        *** Dropout
        *** Artificially expanding data set

Pre-requisites: There is some heavier mathematics in learning the four fundamental equations behind backpropagation, so a basic familiarity with multivariable calculus and matrix algebra is expected, but nothing advanced is required. (The backpropagation equations can be also just accepted without bothering with the proofs since the provided Python code for the simple network just make use of the equations.) Basic familiarity with Python or similar computer language.

Speaker Background: CL Kim works in Software Engineering at CarGurus, Inc. He has graduate degrees in Business Administration and in Computer and Information Science from the University of Pennsylvania. He had previously taught for a few years the well-rated IEEE Boston Section class on introduction to the Android platform and API.

https://ieeeboston.org/event/neuralnetworks/?instance_id=3453

2024 IEEE INTERNATIONAL SYMPOSIUM ON PHASED ARRAY SYSTEMS AND TECHNOLOGY

15 – 18 October 2024 - Hynes Convention Center, Boston, MA USA

About the Symposium

Phased array systems continue to be a rapidly evolving technology with steady advances motivated by the challenges presented to modern military and commercial applications. This symposium will present the most recent advances in phased array technology and present a unique opportunity for members of the international community to interact with colleagues in the field of Phased Array Systems.and Technology.

13 May 2024 – full paper submission deadline
Submission Site: https://cmt3.research.microsoft.com/ARRAY2024/

IEEE-ARRAY.org

DSP for Wireless Communications

Dates & Times: Live Workshops: 6:00 - 7:30PM ET, Thursdays, July 27, August 3, 10, 17, 24
First Video Release, July 20, 2023, (Orientation) 6:00 - 6:30PM
Additional videos released weekly in advance of that week's live session

Speaker: Dan Boschen

Location: Zoom Webinar

New Format Combining Live Workshops with Pre-recorded Video

- This is a hands-on course providing pre-recorded lectures that students can watch **on their own schedule** and an **unlimited number of times** prior to live Q&A/Workshop sessions with the instructor. Ten 1.5 hour videos released 2 per week while the course is in session will be available for up to two months after the conclusion of the course...until October 24, 2023.

Course Summary

This course is a fresh view of the fundamental and practical concepts of digital signal processing applicable to the design of mixed signal design with A/D conversion, digital filters, operations with the FFT, and multi-rate signal processing. This course will build an intuitive understanding of the underlying mathematics through the use of graphics, visual demonstrations, and applications in GPS and mixed signal (analog/digital) modern transceivers. This course is applicable to DSP algorithm development with a focus on meeting practical hardware development challenges in both the analog and digital domains, and not a tutorial on working with specific DSP processor hardware.

Now with Jupyter Notebooks!

This long-running IEEE Course has been updated to include Jupyter Notebooks which incorporates graphics together with Python simulation code to provide a "take-it-with-you" interactive user experience. No knowledge of Python is required but the notebooks will provide a basic framework for proceeding with further signal processing development using that tools for those that have interest in doing so.

This course will not be teaching Python, but using it for demonstration. A more detailed course on Python itself is covered in a separate IEEE Course "Python Applications for Digital Design and Signal Processing".

Students will be encouraged but not required to load all the Python tools needed, and all set-up information for installation will be provided prior to the start of class.

Target Audience:

All engineers involved in or interested in signal processing applications. Engineers with significant experience with DSP will also appreciate this opportunity for an in-depth review of the fundamental DSP concepts from a different perspective than that given in a traditional introductory DSP course.

Benefits of Attending/ Goals of Course:

Attendees will build a stronger intuitive understanding of the fundamental signal processing concepts involved with digital filtering and mixed signal analog and digital design. With this, attendees will be able to implement more creative and efficient signal processing architectures in both the analog and digital domains. The knowledge gained from this course will have immediate practical value for any work in the signal processing field.

Topics / Schedule:

Class 1: Correlation, Fourier Transform, Laplace Transform
Class 2: Sampling and A/D Conversion, Z –transform, D/A Conversion
Class 3: IIR and FIR Digital filters, Direct Fourier Transform

*Class 4: Windowing, Digital Filter Design, Fixed Point vs Floating Point*
Class 5: Fast Fourier Transform, Multi-rate Signal Processing, Multi-rate Filters

Speaker's Bio:

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 currently 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 at: http://www.linkedin.com/in/dan-boschen
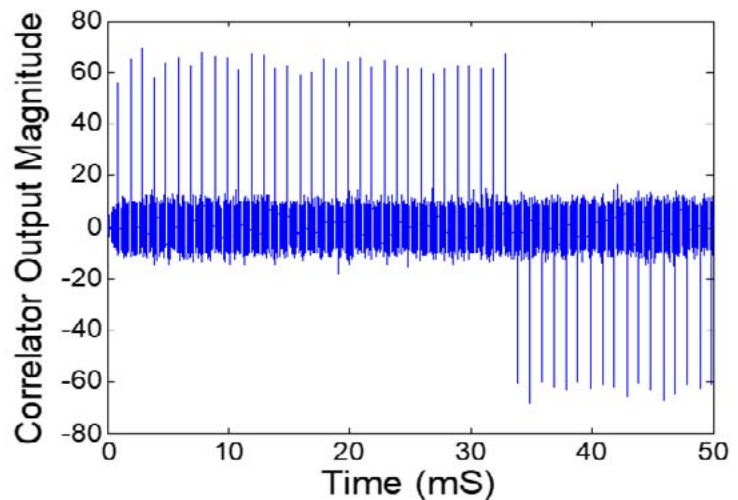
Linear Phase FIR Filter
(8-bit quantized filter coefficients)
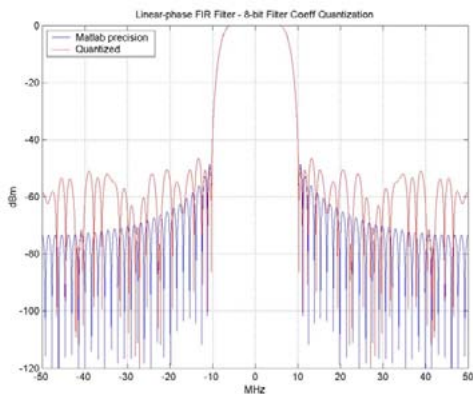
Multi-stage CIC
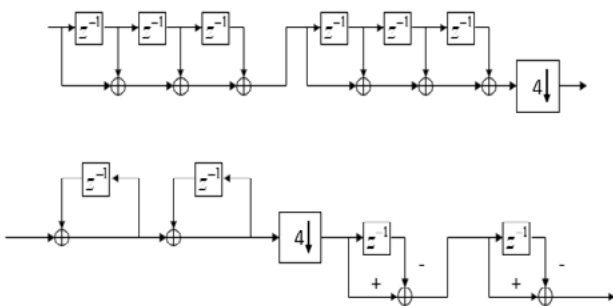
Sliding Correlation

Decision (Run/Cancel) Date for this Course is Monday, July 17, 2023

IEEE Members	$190
Non-members	$210

https://ieeeboston.org/event/digital-signal-processing-webinar/?instance_id=3435

Digital Signal Processing (DSP) for Software Radio

Dates & Times: Live Workshops: 6 - 7:30PM EST; Thursdays, October 19, 26, November 2, 9, 16
First Video Release and orientation, 6 - 6:30PM October 12, 2023
Additional videos released weekly in advance of that week's live session!

Speaker: Dan Boschen

Location: Zoom

Attendees will have access to the recorded session and exercises for two months (until January 16, 2024) after the last live session ends!

This is a hands-on course providing pre-recorded lectures that students can watch on their own schedule and an unlimited number of times prior to live Q&A/Workshop sessions with the instructor. Ten 1.5 hour videos released 2 per week while the course is in session will be available for up to two months after the conclusion of the course.

Course Summary This course builds on the IEEE course "DSP for Wireless Communications" also taught by Dan Boschen, further detailing digital signal processing most applicable to practical real-world problems and applications in radio communication systems. Students need not have taken the prior course if they are familiar with fundamental DSP concepts such as the Laplace and Z transform and basic digital filter design principles.

This course brings together core DSP concepts to address signal processing challenges encountered in radios and modems for modern wireless communications. Specific areas covered include carrier and timing recovery, equalization, automatic gain control, and considerations to mitigate the effects of RF and channel distortions such as multipath, phase noise and amplitude/phase offsets.

Dan builds an intuitive understanding of the underlying mathematics through the use of graphics, visual demonstrations, and real-world applications for mixed signal (analog/digital) modern transceivers. This course is applicable to DSP algorithm development with a focus on meeting practical hardware development challenges, rather than a tutorial on implementations with DSP processors.

Now with Jupyter Notebooks! This long-running IEEE Course has been updated to include Jupyter Notebooks which incorporates graphics together with Python simulation code to provide a "take-it-with-you" interactive user experience. No knowledge of Python is required but the notebooks will provide a basic framework for proceeding with further signal processing development using that tools for those that have interest in doing so.

This course will not be teaching Python, but using it for demonstration. A more detailed course on Python itself is covered in a separate IEEE Course routinely taught by Dan titled "Python Applications for Digital Design and Signal Processing".

**All set-up information for installation of all tools used will be provided prior to the start of class.**

Target Audience: All engineers involved in or interested in signal processing for wireless communications. Students should have either taken the earlier course "DSP for Wireless Communications" or have been sufficiently exposed to basic signal processing concepts such as Fourier, Laplace, and Z-transforms, Digital filter (FIR/IIR) structures, and representation of complex digital and analog signals in the time and frequency do-

if you are uncertain about your background or if you would like more information on the course.

Benefits of Attending/ Goals of Course:

Attendees will gain a strong intuitive understanding of the practical and common signal processing implementations found in modern radio and modem architectures and be able to apply these concepts directly to communications system design.

Topics / Schedule:

Class 1: DSP Review, Radio Architectures, Digital Mapping, Pulse Shaping, Eye Diagrams

Class 2: ADC Receiver, CORDIC Rotator, Digital Down Converters, Numerically Controlled Oscillators

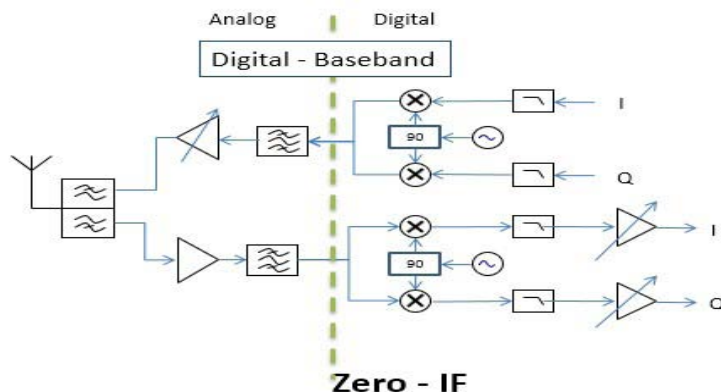*Class 3:* Digital Control Loops; Output Power Control, Automatic Gain Control

Class 4: Digital Control Loops; Carrier and Timing Recovery, Sigma Delta Converters

Class 5: RF Signal Impairments, Equalization and Compensation, Linear Feedback Shift Registers
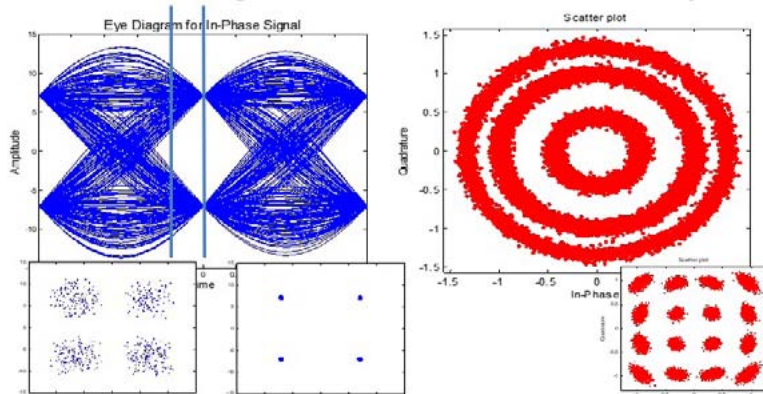
Speaker's Bio:

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 and has taught courses on DSP to international audiences for over 15 years. Dan is a contributor to Signal Processing Stack Exchange https://dsp.stackexchange.com/, and is currently at Microchip (formerly Microsemi and Symmetricom) leading design efforts for advanced frequency and time solutions.
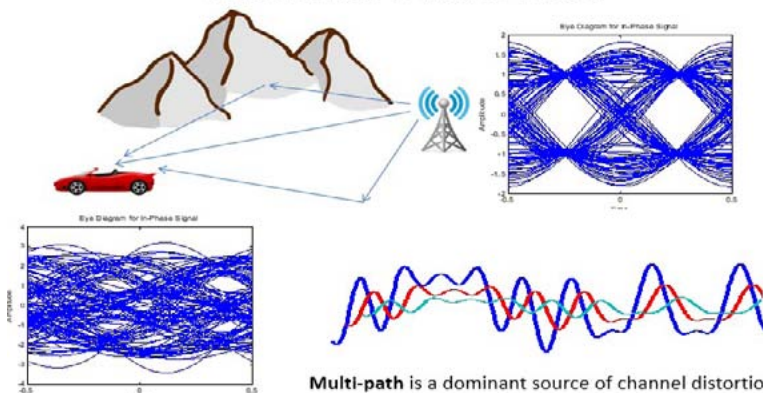
Decision (Run/Cancel) Date for this Course is Monday, October 9, 2023

IEEE Members	$190
Non-members	$210

For more background information, please view Dan's Linked-In page at: http://www.linkedin.com/in/dan-boschen

Radio Architectures

Timing and Carrier Recovery

Channel Distortion

Multi-path is a dominant source of channel distortion

https://ieeeboston.org/event/dspswradio/?instance_id=3429