

THE IEEE NORTH JERSEY SECTION NEWSLETTER

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Message from the IEEE North Jersey Section Chair Prof. Hong Zhao

I am pleased to share with you this month's newsletter. As you know, our organization is committed to advancing technology for the benefit of humanity, and technical seminars are an essential tool for achieving this goal. The technical seminars scheduled in April cover various topics from software to hardware, from standards to implementation technology, and student branch activity. Our goal is to offer a unique opportunity for professionals to stay up-to-date on the latest advances in their field, gain new skills and knowledge, and network with other experts in the industry. In addition to traditional in-person

seminars, we also offer a wide range of online and hybrid events, making it easier than ever for members to participate from anywhere in the world. I hope you enjoy the many technical seminars offered by North Jersey Section, whether in-person or online. Thanks to all volunteers of North Jersey Section who put all this together and organize these events. Thank you for your continued support of IEEE, and I look forward to seeing you at one of our events in April!

Best wishes,

Hong Zhao,

IEEE North Jersey Section Chair

IEEE – IMPORTANT EVENTS, ARTICLES, ANNOUNCEMENTS AND REMINDERS:

- This Month's Communications Society News from Around the World
- "Experiment Advances Fusion Energy" An article by Harry Roman

Experiment Advances Fusion Energy

For well over 70 years scientists and engineers have been trying to make fusion energy a reality. Where nuclear fission is the splitting of heavy atoms (uranium) to make electricity, nuclear fusion is the combining of light atoms to make even more energy available. Fusion is the process that powers the stars, including our own sun-without the nasty brew of waste that results from nuclear fission.

On December 12, 2022 at the Lawrence Livermore National Labs (LLNL), the first fusion reaction on Earth was demonstrated. Using 192 lasers carefully targeted upon a fuel pellet to produce more energy than was consumed in making the reaction happen-what scientists call a net gain of energy - they accomplished it without any production of carbon dioxide. Most fusion efforts use the two heavy versions of hydrogen, deuterium, and tritium, as the fuel source, the so-called fuel pellet.

This experimental success will ultimately lead to a very clean new energy option, probably in the next 20-30 years, as engineers design and pilot test the first prototype power stations to use this process.

Yes, this experiment was a very big deal indeed!

Talk to you again soon...

Harry

(Harry T. Roman: Life Senior Member (htroman49@aol.com)

(Author & Advisor, Edison Innovation Foundation), (Retired-PSE&G Co.), (htroman49@aol.com)

IEEE members are instrumental in the developing new technology for 5G fiber optics - Recognized by the Lightwave Innovation Review

IEEE members, Craig Polk, MBA (NJ, IEEE North Jersey Section) and Rakesh Sambaraju, PhD (PA) working for Vitex LLC, a New Jersey-based developer of innovative, high-performance optical solutions for telecom, data centers, military, medical, and more, are excited about a new, one-of-a-kind product for the 5G market: a 100G to 4x25G bi-directional transceiver. Recently recognized by the Lightwave Innovation Review, the single fiber breakout AOC allows a 100G port to breakout to 4x 25G LC connections, where each 25G connection is a single fiber. The QSFP28 device contains 4 optical engines, each of which is a 25G-BiDi transmitting at 1270 nm and receiving at 1330 nm. The interface to fiber fronthaul infrastructure is provided with 4x single-fiber pigtails.

Vitex's new AOC product enables 5G telecom operators to:

- · Double their existing fronthaul fiber capacity
- Provide 25G bi-directional connectivity over a single fiber
- · Deploy 25G BiDis to denser 100G routers
- · Rely on interoperability with off-the-shelf SFP-28s

"5G growth is calling for extensive future cable needs. Vitex has designed this single fiber breakout cable to address this specific installation challenge," observes Dr. Rakesh Sambaraju, Director of Sales and Product Development at Vitex and IEE Communication Society member. "The new 100G bi-directional breakout cable at 25G will double the capacity of installed fiber and speed up installations so that operators can rollout new 5G market deployment faster. We are excited that the Lightwave judges could see the innovation in our design and the impact to the 5G telecom marketplace."

Mr. Polk, Vitex Product Manager and former longtime Nokia wireless technology engineer and IEEE Photonics Society and EXCOM North Jersey section, notes, "Field installation is always expensive and a surprise because there's so much legacy 3G and 4G hardware out there. The 100G breakout single fiber AOC will cut down on cable procurement, installation time while retaining the existing 100G routers. With my experience, this is only a win for installers and overall 5G rollout." The new Vitex 100G BiDi transceiver and breakout AOC, developed by utilizing advanced manufacturing capabilities of ColorChip, was on display at OFC 2023 Booth 2600. The product is featured on Lightwave's website under "Innovation

Reviews." Product information and sample requests are available at www.vitextech.com/goBiDi.

The Terra North Jersey STEM Fair

The Terra North Jersey STEM Fair (TNJSF) is a high school student competition in all STEM fields, in which students, individually or in groups, present a wide variety of projects. Most of the projects are investigative in nature, posing and attempting to answer some question or problem, either through experimentation and design or in a theoretical sense. All areas of science, math, and engineering are included. The fair accepts entries from ten counties of northern New Jersey: Bergen, Essex, Hunterdon, Middlesex, Morris, Passaic, Somerset, Sussex, Union, and Warren. The home page for the TNJSF is https://tnjsf.zfairs.com.

The mission of the TNJSF is to support, encourage, and recognize student involvement in scientific research, with the belief that students can only truly appreciate the creative nature of the scientific process if they have actually experienced it themselves. In addition, TNJSF endeavors to provide resources which further this overarching goal, including giving students various opportunities to interact with professional scientists and engineers. The opportunity to partake of the TNJSF itself as well as the other resources offered is intended to be open to all high school students in the northern NJ region.

IEEE North Jersey section sponsors awards for projects in Engineering, Biomedical Engineering, and Computer Science that demonstrate the use of sound engineering principles.

A team of judges from our IEEE North Jersey Section, as seen in the picture (Fig. 1) has selected the following students (see Table 1) as the recipients of the IEEE Young Engineer Award.

Cash award and Certificate of achievement: The awardees will be invited with one guest and presented the award check and certificate during the section's annual Award Banquet to be held in May 2023.



Fig. 1: IEEE North Jersey Section's Team of Judges for the TNJSF IEEE

Table 1: Recipients of the IEEE NJ Young Engineer Award

IEEE North Jersey Section Young Engineer Award

BE.01	Ryan Kwon	Bergen Catholic High School
<u>CS.01</u>	Divya Krishna	Edison High School
<u>CS.05</u>	Zayn Rekhi	Millburn High School
<u>CS.08</u>	Ryan Rong Curtis J Zhou	The Peddie School
EN.07	Charles Jiang Diego Pasini	The Pingry School
<u>EN.10</u>	Abhay Bhaskar	Middlesex Academy of Science, Mathematics, and Engineering Technology
EN.11	Kai Song	Tenafly High School

Calendar of Events

Events for the month of April 2023

Title	Date	Hosts	Location
Byte Into Hardware: Hardware Hackathon: New Jersey Institute of Technology, C16	02 Apr 2023 08:00 AM	SBC01241 - New Jersey Institute of Technology, C16	Newark, New Jersey
Electronics on anything - how thin film electronics can instrument the world: North Jersey Section	05 Apr 2023 11:30 AM	R10327 - North Jersey Section, NANO042 - IEEE Nanotechnology Council	Hoboken, New Jersey

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IEEE North Jersey Section EXCOM - Meeting 6:30 PM: North Jersey Section	05 Apr 2023 06:30 PM	R10327 - North Jersey Section	Newark, New Jersey
EMC Standards - recent advancements for smart grid: NJ Coast/Princ/Central Jersey Sec Jt Ch, AP/VT/EMC	06 Apr 2023 06:30 PM	CH01066 - NJ Coast/Princ/Central Jersey Sec Jt Ch, AP/VT/EMC, R1 - Northeastern USA - Region 1, R10327 - North Jersey Section	Virtual
IEEE CAS Seasonal School: Intelligent Memory & Sensor at the Edge (IMS 2023): North Jersey Section Jt Chapter, CAS04/ED15	14 Apr 2023 09:00 AM	CH01184 - North Jersey Section Jt Chapter, CAS04/ED15, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01258 - North Jersey Section Chapter, TEM14	Newark, New Jersey
Design Elements of Complex Systems: North Jersey Section Chapter, SP01	19 Apr 2023 12:00 PM	CH01091 - North Jersey Section Chapter, SP01, CH01177 - North Jersey Section Chapter, C16	Virtual
Game Changing Technology for EW Systems: North Jersey Section Jt Chapter, AP03/MTT17	26 Apr 2023 11:00 AM	CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, R10327 - North Jersey Section, CH01215 - North Jersey Section Chapter, AES10, CH01290 - North Jersey Section Chapter, MAG33/UFFC20/SEN39, SIGHT177 - North Jersey Section SIGHT	Clifton, New Jersey
Face Video Compression with Generative Models: North Jersey Section Chapter, SP01	03 May 2023 12:00 PM	CH01091 - North Jersey Section Chapter, SP01, CH01177 - North Jersey Section Chapter, C16, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17	Virtual
2023 IEEE Stevens Undergraduate and Graduate AI Workshop (IEEE SUGAIW-2023): North Jersey Section	06 May 2023 09:00 AM	R10327 - North Jersey Section, CH01081 - North Jersey Section, EMB18, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, CH01153 - North Jersey Section Chapter, VT06	Hoboken, New Jersey
Introduction To Machine Learning: North Jersey Section Chapter, COM 19	06 May 2023 01:30 PM	CH01156 - North Jersey Section Chapter, COM 19	Teaneck, New Jersey
2023 IEEE North Jersey Section Awards Banquet: North Jersey Section	07 May 2023 03:00 PM	R10327 - North Jersey Section	Whippany, New Jersey

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Distributed beamforming aided wireless energy transfer: North Jersey Section Jt Chapter, AP03/MTT17	12 Jun 2023 06:00 PM	CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01184 - North Jersey Section Jt Chapter, CAS04/ED15, CH01153 - North Jersey Section Chapter, VT06, CH01178 - North Jersey Section Chapter, PHO36, SIGHT177 - North Jersey Section SIGHT, CH01095 - North Jersey Section Chapter, CS23, SIGHT056 - AP- S SIGHT	Newark, New Jersey
One-Day Summer Camp for Female High School Students: SHE in ECE: North Jersey Section Jt Chapter, CAS04/ED15	27 Jun 2023 08:00 AM	CH01184 - North Jersey Section Jt Chapter, CAS04/ED15, R10327 - North Jersey Section, SIGHT177 - North Jersey Section SIGHT, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, WE10327 - North Jersey Section Affinity Group, WIE	Newark, New Jersey

Past Month's Events: The month of March 2023

Title	Date	Hosts	Location
IEEE North Jersey Section EXCOM - Meeting 6:30 PM: North Jersey Section	01 Mar 2023 06:30 PM	R10327 - North Jersey Section	Teaneck, New Jersey
Women in Electrical and Computer Engineering (WiE): North Jersey Section Jt Chapter, CAS04/ED15	07 Mar 2023 04:30 PM	CH01184 - North Jersey Section Jt Chapter, CAS04/ED15, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, WE10327 - North Jersey Section Affinity Group, WIE	Newark, New Jersey
Towards Low-Power and Internet- Scale Mixed Reality: North Jersey Section Chapter, C16	09 Mar 2023 04:00 PM	CH01177 - North Jersey Section Chapter, C16	Newark, New Jersey
How Low Can They Go? North Jersey Section Jt Chapter, AP03/MTT17	10 Mar 2023 03:00 PM	CH01092 - North Jersey Section Jt Chapter, AP03/MTT17	Paterson, New
Lead Generation for Consultants: North Jersey Section Affinity Group, CN	16 Mar 2023 06:30 PM	CN10327 - North Jersey Section Affinity Group, CN	Virtual
2023 IEEE North Jersey Section Student Presentation Competition: North Jersey Section	21 Mar 2023 06:30 PM	R10327 - North Jersey Section, STB00591 - Fairleigh Dickinson University	Teaneck, New Jersey

A Simulation Perspective: Cross- Coupling Effects analysis of devices for advanced technological nodes: North Jersey Section Jt Chapter, CAS04/ED15	22 Mar 2023 04:45 PM	CH01184 - North Jersey Section Jt Chapter, CAS04/ED15, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01258 - North Jersey Section Chapter, TEM14	Newark, New Jersey
Shaping the radio channel for best connectivity: North Jersey Section Jt Chapter, AP03/MTT17	23 Mar 2023 01:00 PM	CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, CH01184 - North Jersey Section Jt Chapter, CAS04/ED15	Virtual
Instrument Transformer Technical Review: North Jersey Section Chapter, PE31	24 Mar 2023 09:00 AM	CH01097 - North Jersey Section Chapter, PE31, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17	South Plainfield
Innovation Day at Nokia Bell Labs: North Jersey Section	25 Mar 2023 08:00 AM	R10327 - North Jersey Section, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, CH01153 - North Jersey Section Chapter, VT06, SIGHT177 - North Jersey Section SIGHT	New Providence, New Jersey
Terra North Jersey STEM Fair - IEEE Young Engineer Award: North Jersey Section	25 Mar 2023 09:00 AM	R10327 - North Jersey Section, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, SIGHT177 - North Jersey Section SIGHT, CH01153 - North Jersey Section Chapter, VT06, SIGHT056 - AP-S SIGHT	Union, New Jersey
2023 IEEE Metropolitan AI Medicine Symposium (IEEE MAIMS-2023): North Jersey Section	25 Mar 2023 08:00 AM	R10327 - North Jersey Section, CH01081 - North Jersey Section, EMB18, CH01092 - North Jersey Section Jt Chapter, AP03/MTT17, CH01178 - North Jersey Section Chapter, PHO36, CH01153 - North Jersey Section Chapter, VT06	Hoboken, New Jersey
Single Channel Speech Enhancement: From Wiener Filtering to Neural Networks: North Jersey Section Chapter, SP01	29 Mar 2023 12:00 PM	CH01091 - North Jersey Section Chapter, SP01, CH01177 - North Jersey Section Chapter, C16	



GRADUATE SCHOOL VIRTUAL OPEN HOUSE!

Wednesday, April 19, 2023, 5 p.m.

Fairleigh Dickinson University

Gildart Haase School of Computer Sciences & Engineering (GHSCSE)

Cybersecurity Leadership: "National Center of Academic Excellence for Cyber Defense Education (CAE-CDE)" by NSA

18 cutting-edge labs, among the best in the North and Mid-Atlantic Regions

Offers 6 Masters of Science (MS) Programs

- *Cybersecurity & Information Assurance
- *Management Information Systems
- *Electrical Engineering
- *Computer Engineering

*E-Commerce

*Computer Science (Data Science, Cloud Computing and more)



Scan Zoom Registration

Scan Grad Program Info





Gildart Haase School of Computer Sciences & Engineering

GRADUATE SCHOOL VIRTUAL OPEN HOUSE!

Wednesday, May 17, 2023, 5 p.m.

Fairleigh Dickinson University

Gildart Haase School of Computer Sciences & Engineering (GHSCSE)

Cybersecurity Leadership: "National Center of Academic Excellence for Cyber Defense Education (CAE-CDE)" by NSA

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- *Electrical Engineering
- *Computer Engineering

*E-Commerce

*Computer Science (Data Science, Cloud Computing and more)



Scan Zoom Registration

Scan Grad Program Info







The Association of Old Crows Garden State Chapter and IEEE North Jersey Section



Co-present a Lunch-and-Learn Event

MCPs with FPGAs & Integrated 64GSPS Direct RF Data Converters - Game Changing Technology for EW Systems



Presenters: Dr. Darren Crum, Technical Area Lead and Program Technical Manager, NSWC Crane

Mr. Ben Esposito, Senior Principal

Engineer, Intel PSG

Mr. Carmine Pagano, SHIP Systems Architect & Technical Director, Intel PSG

This talk describes two new Heterogeneous Multichip Packaged (MCP) devices prototyped under the DoD State of the Art (SOTA) Heterogeneous Integrated Packaging (SHIP) program. These devices were designed by integrating state of the art Quad-Channel Direct RF Data Converter Tiles (DCTs) operating at 64 Giga Samples per Second (GSPS) in the same package with leading edge Field Programmable Gate Array (FPGA) devices. The DCTs also include built in Digital Upconverters (DUCs) and Digital Downconverters (DDCs) to offload this processing from the FPGAs and lower the overall power of the device. The DUCs and DDCs can be tuned in real time across the full 32GHz of instantaneous input bandwidth (IBW). The Direct RF capabilities of the DCTs combined with the massive IBW, high dynamic range, low latency, small size, and low power of these devices allows unprecedented improvements to the Size, Weight, Power & Cost (SWAP-C) for Electronic Warfare Systems. We will give an overview of the SHIP program, describe the two MCP configurations offered, describe the operating modes of the Data Converter Tiles, show some RF performance measurements of the DCTs, and finally will discuss some target applications for the MCP devices.

Attend virtually or in person and enjoy a complimentary lunch while learning about this technology!

WHEN:

Wednesday, April 26, 2023 1130-1300 EST

WHERE:

L3Harris Technologies, Auditorium 77 River Road, Clifton, NJ and <u>YOUR DESK</u> via MS Teams!

RSVPNo Later Than Thursday, April 18 to:

Nicole Zaretski, Nicole. Zaretski@I3harris.com

Please note: in-person attendance is limited to US-ONLY. Non-L3Harris individuals will be required to provide information for security screening prior to arrival

Seating is Limited - Pizza and Beverages Provided for Lunch Courtesy of



2023 IEEE North Jersey Section Volunteers

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