LINA J. KARAM, Ph.D.

Fellow of the IEEE and Expert Consultant
Emerita Professor, School of ECEE, Arizona State University, USA
President, PICARIS LLC
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R&D Topics and Publications Highlights

Artificial Intelligence, Machine Learning, Deep Learning, Transformers, LLMs; Natural Language Processing; Computer Vision (2D, 3D, and multi-D); Signal, Image, and Video Processing, Compression, and Transmission; Automated Quality Assessment and Enhancement; Autonomous Systems and Robotics; Perceptual-based Processing; Visual Attention Models; Multidimensional Signal Processing; Biomedical Signal Processing; Joint Source-Channel Coding; Digital Filtering; Real-Time DSP. Supervised to completion as main advisor 50 graduate students (25 PhD and 25 MS Thesis students). Supervised and managed industry-sponsored projects amounting to multi-million USD in addition to federal-sponsored projects. Led the development and implementation of GenAI solutions and products for NLP, Computer Vision, and other applications. Recruited, led and managed teams of engineers and developers. Developed and executed strategic plans. Led and pursued patent filings.

Industry Collaborations and Technology Transfer

Led R&D and product development for AI/machine learning, computer vision, NLP, signal processing, quality assessment/QoE, imaging, image/video processing, compression, communication, camera image processing (calibration, distortion correction, autofocus, modeling), robotics and autonomous driving projects with various industries including Intel, Google, NTT, Motorola, Freescale, General Dynamics, NASA, BNI, TGEN, and AIAEC; elected to IEEE Fellow for contributions in perceptual-based visual processing, image and video communications (including video compression and transmission) and digital filtering; image and video processing, computer vision, machine learning, automated manufacturing, 3D Quality Inspection, and autonomous driving technologies development with Intel; image/video processing and computer vision development in collaboration with Microsoft and Google; image and video processing and compression development at AT&T Bell Labs (Murray Hill); image and video compression and transmission development and productization in collaboration with Motorola and General Dynamics and the first to enable the transmission of video over the Iridium Satellite Network; work on digital filtering widely adopted for the development of improved applications and products in various sectors including but not limited to telecommunications, transmission, health, signal processing, and geophysical applications, and part of which has been integrated in the widely used MATLAB Signal Processing Toolbox (as the cfirpm function); multi-dimensional data processing and visualization at Schlumberger; technical advisor as part of AVTC ECOCAR Mobility Challenge; co-founder of biotech startup with product licensed to healthcare industries; co-founder and CTA/CTO of AI startup; inventor on patented image/video compression and communication, computer vision, and machine learning technologies.

Highlights

Led and oversaw the development and implementation of innovative GenAI solutions and *products* for NLP, Computer Vision, and LLM-based applications; recruited, led and managed a team of engineers; developed and executed strategic plans; led and pursued patent filings.

Led various teams within and across disciplines including but not limited to R&D, project management, productization, administrative, technical, and editorial teams.

Inventor on 8 issued US patents and on two published US Patent Application.

Expert delegate of the ISO/IEC JTC1/SC29 Committee (Coding of audio, picture, multimedia and hypermedia information) and participating in JPEG/MPEG standardization activities including machine learning based visual compression.

Expert consulting in IP/Patents, Artificial Intelligence, Machine Learning. GenAI, NLP, Computer Vision, Data and Signal Processing, Image/Video Coding, Image/Video Processing, Image/Video Compression and Communication. *Check out the open access AI/Machine Learning Hands-On Book at:* https://deeplearningtextbook.org/

Emerita Professor, School of ECEE, Arizona State University (2020-Present)

Director, Image, Video & Usability (IVU) R&D Laboratory at ASU (1995-Present)

President, PICARIS, LLC, a consulting company (2007-present)

Co-founder and CTA/CTO, AIAEC LLC (2023-2025)

Editor-In-Chief, IEEE Journal on Selected Topics in Signal Processing (2019-2021)

Dean, School of Engineering, Lebanese American University (2020-2022)

Director, Real-time Embedded Signal Processing (RESP) Laboratory at ASU (2000-2019)

Computer Engineering Program Chair, ASU Fulton Schools of Engineering (2016-2017)

Director of Industry Engagement, ASU Fulton Schools of Engineering (2018-2019)

National Academy of Inventors, ASU Chapter (2019-Present)

Featured in Stanford Study among the top 2% of World Scientists in AI and Image Processing

Featured in Research.com among World Top Computer Science Scientists

Invited industry forum speaker and panelist at the 1st Industry Forum on Large Language Models in Consumer Technologies (LLMCT), IEEE ICCE 2025, Las Vegas, USA, January 2025.
Watch: https://www.youtube.com/watch?v=_0gslrBtkcY
Read: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10958205

Established the World's First Visual Innovation Award in 2016:
https://fullcircle.asu.edu/faculty/visual-tech-visionaries-honored-innovation-awards/
https://www.youtube.com/watch?v=pEZ2mT5sASw

Established the World's First Multimedia Star Innovator Award in 2019.

Established in 2018 an ASU-Silicon Valley Fellowship/Internship Program for Graduate Students (Computer Engineering, Electrical Engineering, Computer Science, Industrial Engineering) with TCL Research America as founding partner.

Established and led in 2018 a University-wide Intel-ASU Collaborative Initiative on Automated Mobility/Autonomous Cars with Intel, ADOT, DPS and GPEC as partners, which culminated in the establishment of the Governor's Institute on Automated Mobility (IAM) at the state level.

Established transdisciplinary Intel-ASU Autonomous Vehicle initiative (2017-2018) and lead PI on grant (funded in 2018):
https://transportation.asu.edu/projects/intel-asu-autonomous-vehicle-initiative/

ADAS lead advisor as part of the DoE/GM-sponsored Advanced Vehicular Technologies (AVTC) EcoCAR3 competition (2017-2018):
https://avtcseries.org/about-avtc/past-competitions/ecocar-3/

Interview with KJZZ 91.5 radio (NPR radio station in AZ) - Preliminary Report: Self-Driving Uber Car Didn't Alert Driver Of Collision Possibility (May 24, 2018):
https://www.kjzz.org/2018-05-24/content-642626-preliminary-report-self-driving-uber-car-didnt-alert-driver-collision-possibility

Podcast-Driverless Cars (August 31, 2018)

Interview with FOX 10 News - Cities and Driverless Cars (October 30, 2018):
https://www.fox10phoenix.com/news/cities-looking-at-how-self-driving-cars-can-change-their-communities

Interview with Phoenix Business Journal - Waymo and Self-Driving Truck Testing (May 29, 2019):
https://www.bizjournals.com/phoenix/news/2019/05/29/waymo-to-resume-self-driving-truck-testing-in.html

Judge on Vision Tank 2019 Start-Up Competition, Embedded Vision Summit, Santa Clara, CA, USA (May 22, 2019):
https://www.youtube.com/watch?v=X-bed7c04lY&feature=youtu.be&t=3

Interview with Associated Press - Verification stamps weren't pre-printed on Arizona ballot envelopes (September 29, 2021):
https://apnews.com/article/fact-checking-205460259311

Established in 2020-2022 the award-winning VIP+ program across various schools and disciplines, adapting the Georgia Tech's Vertically Integrated Projects (VIP) model by intergrating an explicit entrepreneurial component into VIP, and served as VIP+ program director and lead LAU PI on grant funded by the US Department of State (US MEPI TLP grant); the established VIP+ program was granted three awards in 2022 by the International VIP Consortium consisting of 44 institutions in 13 countries (out of which 25 institutions are in the US):
https://news.lau.edu.lb/2022/laus-vertically-integrated-project-wins-major-international-consortium-awards.php
https://www.vip-consortium.org/node/1422
https://news.lau.edu.lb/2021/new-mepi-grant-to-boost-employability.php
https://mepitl.lau.edu.lb/news/the_lau_school_of_engineering_or.php
Video with students' testimonials: https://youtu.be/W0y1WNnd9ko

Established in 2021 a partnership between the United Nations Development Program (UNDP)'s Energy Innovation Hub and LAU School of Engineering and secured UNDP grant funding:
https://eihub-lb.com/

Led an initiative with a consortium of industry partners to help advance the Renewable Energy/Solar Industry Sector in Lebanon and served as lead PI on USD multi-million proposal to USAID Trade and Investment Fund (USAID-TIF) to establish a photovoltaic (PV) pilot scale module manufacturing facility, a certified PV testing facility and a training facility to assist the local solar energy companies to build customizable high-quality PV panels. The

submitted proposal was highly scored and has been selected to move to the co-creation stage with industry partners.
https://www.linkedin.com/feed/update/urn:li:activity:6894991934830501889/
https://news.lau.edu.lb/2022/toward-solar-panels-made-in-lebanon.php
https://news.lau.edu.lb/2022/harnessing-solar-energy-in-lebanon-with-the-support-of-usaid.php

Established in 2021 the First ENPMED (Engineering PreMed) program incorporating a Premed track in all engineering majors at the Lebanese American Univesity (LAU):
https://news.lau.edu.lb/2021/medicine-by-way-of-engineering-new-premed-track-at-lau.php

Established in 2021 iLEAP (industry-focused Lebanese Education & Academia Partnership) between LAU and LebNET (https://lebnet.us/), a non-profit US organization focused on education and mentoring, and comprising a network of technology experts, Fortune 500 managers and executives, venture capitalists and investors, startup founders and entrepreneurs, academics, consultants and small business owner in North America:
https://lebnet.us/LAU-iLEAP
https://news.lau.edu.lb/2021/lebnet-lau-initiative-adds-leverage-for-engineering-students.php

Developed and submitted to LAU's Board of Trustees in 2021 a proposal and business plan to establish the *LAU Industrial Hub*. The proposal was approved by LAU's Board of Trustees.

Interview with Al Nahar Newspaper – Engineering Premed (ENPMED), Medicine and Medical Technologies through Engineering (December 14, 2021):
https://www.annahar.com/arabic/section/77-%D9%85%D8%AC%D8%AA%D9%85%D8%B9/13122021062414414

SHORT BIO

Lina Karam is currently an expert consultant and an Emerita Professor at Arizona State University. She is also President of PICARIS, LLC, a consulting company. She is a co-founder of AIAEC, LLC and served as its Chief Technical Advisor/CTO, where she led the development and implementation of GenAI solutions and products for NLP, Computer Vision, and LLM-based applications (2023-2025). Prior to this, she was a tenured Full Professor, Computer Engineering Program Chair, Computer Engineering Director for Industry Engagement at Arizona State University. Dr. Karam is an IEEE Fellow, the highest grade level in IEEE which is conferred each year to no more than one-tenth of 1% of all IEEE voting members, for her contributions in the image and video processing, visual media coding and transmission, and digital filtering areas. Dr. Karam has been featured in Research.com among World Top Computer Science Scientists and in Stanford Study among the top 2% of World Scientists in AI and Image Processing. Dr. Karam is a recipient of the National Science Foundation CAREER Award, NASA Technical Innovation Award, the Intel Outstanding Researcher Award, the IEEE SPS Best Journal Paper Award, the IEEE Phoenix Section Outstanding Faculty Award, and the IEEE Region 6 Award. She served as Editor-in-Chief of the high-impact IEEE Journal on Selected Topics in Signal Processing (IEEE JSTSP) from 2019 to 2021. From 2020 to 2022, Dr. Karam served as Dean of the School of Engineering at the Lebanese American University. At ASU, Dr. Karam helped in establishing two transdisciplinary programs, the Computer Engineering Program (across Computer Science and Electrical Engineering) and the Robotics & Autonomous Systems (RAS) Program (across four schools). Dr. Karam served on the IEEE Signal Processing Society (SPS) Board of Governors, IEEE SPS

Conference Board, IEEE SPS Publications Board, IEEE SPS Awards Board, IEEE Circuits and Systems (CAS) Fellow Evaluation Committee, IEEE PSPB Strategic Planning Committee, IEEE TechRxiv Advisory Board (as Chair), IEEE TAB/PSPB Products and Services Committee, IEEE EAB Faculty Resources Committee, IEEE SPS IVMSP and MMSP Technical Committees, IEEE CAS DSP Technical Committee, IEEE Access Journal Senior Editorial Board, and various journal editorial boards. She served as the General Chair of IEEE ICIP 2016, General Co-Chair of IEEE ICME 2019, Technical Program Chair of IEEE ICIP 2009, General Chair of IEEE DSP/SPE 2011 Workshops. She cofounded the International Conference on Quality of Multimedia Experience (QoMEX). In addition to serving as the EiC of IEEE JSTSP, Dr. Karam served as the Lead Guest Editor, IEEE Signal Processing Magazine, Special Issue on Autonomous Driving. She is currently serving on the IEEE TechRxiv Editorial Board, IEEE Industry Engagement Committee (IEC) and IEEE Educational Educational Board (EAB) as Liaison. She is an inventor with 8 issued US patents in the fields of AI/machine learning, computer vision, image/video processing, coding, and transmission. She has also served as expert delegate of the ISO/IEC JTC1/SC29 Committee (Coding of audio, picture, multimedia and hypermedia information) and participated in JPEG/MPEG standardization activities including integrating AI within upcoming standards.

EDUCATION

Georgia Institute of Technology
- Ph.D., Electrical Engineering, 1995
- M.S., Electrical Engineering, 1992

American University of Beirut
- B. E., Computer and Communications Engineering, 1989.

EMPLOYMENT/POSITIONS

Expert Consultant and President of PICARIS, LLC (2007-present)

Emerita Professor and Director of R&D IVU Lab, School of Electrical, Computer & Energy Engineering, Arizona State University, USA (2020-present)

Chief Technical Advisor/CTO and Co-founder, AIAEC LLC (2023 – 2025), leading and overseeing the development and implementation of GenAI solutions and products for NLP, Computer Vision, and LLM-based applications

Professor and Dean, School of Engineering, Lebanese American University (2020-2022)

Computer Engineering Graduate Program Chair and Director of Industry Engagement (2016-2018), Arizona State University, Tempe, AZ

Professor and Director of R&D IVU Lab (May 2010 – Dec 2019), School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ.

Associate Professor and Director of R&D IVU Lab (August 2001 – May 2010), School of Electrical, Computer, and Energy Engineering (formerly known as Department of Electrical Engineering), Arizona State University, Tempe, AZ.

Visiting Associate Professor (August 2005 – December 2005), Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX.

Assistant Professor and Director of R&D IVU Lab (August 1995 – August 2001), Department of Electrical Engineering, Arizona State University, Tempe, AZ.

Intern (1994), AT&T Bell Laboratories, Murray Hill, NJ.

Research Assistant (September 1992 – June 1995), School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA.
Research Assistant (June 1991 – September 1992), Graphics, Visualization, and Usabilty (GVU) Center, Georgia Institute of Technology, Atlanta, GA.
Intern (1992), Schlumberger, Austin, TX
Research Assistant (February 1990 - June 1991), Scientific Visualization Group, Georgia Institute of Technology, Atlanta, GA.
Intern (1988), Computing Department, Imperial College, London, UK.

INTELLECTUAL PROPERTY LITIGATION

Provided expert reports, declarations, testimony at depositions, testimony at trial. Cases are listed below for the last 5 years (2020-2025) excluding engagements that require confidentiality. Clients are shown in bold.

- **ClearCorrect Operating LLC** v. Align Technology Inc. (2025), USPTO PTAB IPR2025-000817
- **Samsung and Google** v. Eyesmatch (2024-present), USPTO PTAB IPR2024-00810
- **Google and Samsung** v. Eyesmatch (2024-present), USPTO PTAB IPR2024-00856
- Ceva Sante Animale v. **Targan** (2024-2025), USPTO PTAB IPR2024-00595
- Dental Monitoring v. **Get-Grin** (2023-present), No. 22-cv-00647-WCB, District Court for the District of Delaware
- **Microsoft** v. RealD Spark (2023-2024), USPTO PTAB IPR2023-01046
- 3Shape A/S v. **Medit** (2023-2024), No. 6:22-cv-00443-ADA-DTG, District Court for the Western District of Texas
- Avago/Broadcom v. **Netflix** (2022-present), District Court of the Hague (Dutch Proceedings)
- Avago/Broadcom v. **Netflix** (2022-present), Munich Regional Court I (German Proceedings)
- **Unified Patents** (2024), USPTO EPR of US Patent 9,432,675
- **Unified Patents** (2024), USPTO EPR of US Patent 6,567,086
- **Unified Patents** (2024), USPTO EPR of US Patent 7,987,285
- **Unified Patents** (2023), USPTO EPR of US Patent 9,854,207
- **Unified Patents** (2022-2023), USPTO EPR of US Patent 6,744,818
- **Unified Patents** v. DigiMedia Tech (2022-2023), USPTO PTAB IPR2022-01182
- **Unified Patents** (2022-2023), USPTO EPR of US Patent 10,390,013
- **Unified Patents** v. Dolby (2022-2023), USPTO PTAB IPR2022-01284
- **Unified Patents** (2022), USPTO EPR of US Patent 10,726,822
- **Unified Patents** v. Sunflower Licensing (2022), USPTO PTAB IPR2022-01498
- **TCL, Samsung, LG, and Realtek** v. DivX (2020-2021), ITC Investigation No. 337-TA-1222
- **Lenovo** v. Nokia (2020), USPTO PTAB IPR2020-01096
- Nokia v. **Lenovo** (2020), No. 5:19-cv-427, District Court for the Eastern District of North Carolina; ITC Investigation No. 337-TA-1208
- **Unified Patents** v. Godo Kaisha IP Bridge1 (2020), USPTO PTAB IPR2020-00867
- **Unified Patents** v. Godo Kaisha IP Bridge1 (2020), USPTO PTAB IPR2020-01433
- **Unified Patents** v. Godo Kaisha IP Bridge1 (2020), USPTO EPR of US Patent 7,515,635

- **Unified Patents** v. Velos Media (2019-2021), USPTO PTAB IPR2020-00352
- **Unified Patents** v. DivX (2019-2020), USPTO PTAB IPR2019-01379
- **Unified Patents** (2019-2020), USPTO EPR of US Patent 9,743,086
- **Unified Patents** v. Velos Media (2019-2020), USPTO PTAB IPR2019-00635

INVITED PRESENTATIONS, SHORT COURSES, AND SELECT PANELS

- *Panel Organizer and Moderator,* "Industry vs Academia: Which is Right for You?," IEEE HKN Pathways to Industry, Live Streamed Online, February 2025.
- *Industry Forum Speaker and Panelist,* "The 1st Industry Forum on Large Language Models in Consumer Technologies (LLMCT)," IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, USA, January 2025.
- *Panelist,* "Faculty Leadership," IEEE/ASEE Frontiers in Education Conference, Texas, USA, October 2023.
- *Invited Lecturer*, "Deep Learning for Quality Robust Visual Recognition," DeepLearn 2022, Guimaraes, Portugal, https://irdta.eu/deeplearn2022sp/
- *Featured guest,* "Artificial Intelligence in Lebanon: Reality and Need," 1st Webinar and Panel Discussion on Artificial Intelligence being organized by the Order of Engineers and Architects in Lebanon (in-person and live streamed over social media), 11 February 2022. https://soe.lau.edu.lb/school/news/2022/webinar-and-panel-discussion-on-.php https://www.facebook.com/oeabeirut/videos/470212477889219/
- *Panelist,* "Diversity Faculty Sharing Experiences," IEEE PROGRESS Workshop, USA, June 2021, October 2021, and June 2020.
- *Keynote Speaker,* "Resilient Machine Learning for Automated Mobility," Communications of the ACM (ACM) Arabia Workshop, August 2020.
- *Plenary/Keynote Speaker,* "Towards Resilient Deep Learning," IEEE International Conference on Image Processing, October 2020.
- *Session Moderator,* Embedded Vision Summit, Silicon Valley, USA, May 2020.
- *Judge/Panelist,* Vision Tank 2019 Start-Up Competition, Embedded Vision Summit, Santa Clara, CA, USA, May 2019.
- *Invited Talk,* "Resilient Deep Learning through Feature Regeneration," Intel Corporation, Phoenix, AZ, April 2019. *Talk hosted by IEEE WIE Phoenix.*
- *Panelist (the only engineer on panel among 6 panelists) with Waymo's CExO,* "Let's Talk Self-Driving: A Fireside Conversation with Waymo's Tekedra Mawakana," Arizona State University, Tempe, AZ, USA, April 2019.
- *Invited Talk,* "Understanding Automated Driving Systems Technologies," Connected and Autonomous Vehicles 101 (CAV 101) Seminar and Roadshow; Education for Arizona Small Towns and Satellite Cities; Tempe, AZ, USA, March 2019.
- *Invited Talk and Panelist,* "Towards Safe, Efficient Automated Driving at Scale," American Bar Association (ABA) Smart Cities Conference, Tempe, AZ, USA, February 2019.
- *Invited Talk,* "Generative Sensing: Reliable Recognition from Unreliable Sensor Data," Embedded Vision Summit, Santa Clara, CA, May 2018. ***Talk highly ranked by attendees.***
- *Plenary Talk*, "Generative Sensing," International Conference on Computing, Networking, and Communications (ICNC), Maui, Hawaii, March 2018.

- *Plenary Talk*, "Generative Sensing: Transforming Unreliable Sensor Data for Reliable Recognition," Twenty-Fourth National Conference on Communications (NCC) 2018, IIT Hyderabad, India, February 2018.
- *Distinguished Speaker*, "A Closer Look at Visual Attention Models," College of Engineering, Penn State University, April 2017.
- *Invited Tutorial Lecture*, "Introduction to Image and Video Compression," Visual Signal Analysis and Processing (VSAP) Workshop, Khalifa University, Abu Dhabi, United Arab Emirates, November 2015.
- *Plenary Distingushed Lecture*, "Attentive Visual Processing – Towards User-Centric Visual Technologies," International Conference on Computing, Networking and Communications (ICNC), February 2014.
- *Intel Webinar*, "Automated Defect Detection and Identification for Semiconductor Units Undergoing Assembly and Test," Intel Corporation, November 2011.
- *Plenary Talk*, "Efficient Perceptual-Based Image and Video Processing," Tenth FEA Student Conference, American University of Beirut, Beirut, Lebanon, May 2011.
- *Expert Panel Talk*, "Trends in 3D Video Processing," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), May 2011.
- *Invited Talk*, "Foundations and Trends of Visual Quality Assessment," American University of Beirut, Beirut, Lebanon, July 2010.
- *Plenary Talk,* "Foundations and Trends of Visual Quality Assessment," 2nd International Workshop on Visual Information Processing (EUVIP), Paris, France, July 2010.
- *Invited Talk*, "Adaptive Rate-Distortion Based Wyner-Ziv Video Coding," Multimedia, Mathematics and Machine Learning II, BIRS, Banff Centre, Banff, Canada, July 2009.
- *Invited Talk*, "Wyner-Ziv Based Low-Complexity Distributed Video Encoding," New Mexico State University, Las Cruces, NM, Nov. 2008.
- *Invited Lecture*, "Real-World Applications for Freshman Engineering Education," NI Week*,* Austin, TX, Aug. 2008.
- *Invited Lecture,* "From Conventional to Distributed Video Coding," IEEE Lebanon Section and American University in Beirut, Beirut, Lebanon, July 2008.
- *Invited Lecture*, "BLAST-DVC: BitpLAne SelecTive Distributed Video Coding," Center for Research in Mathematics (CIMAT), Guanajuato, Mexico, May 2008.
- *Short Course,* Lina J. Karam, "Image Compression: Foundations," Qualcomm, San Diego, CA, May 2008. Invited One-Day Short Course.
- *Short Course,* Lina J. Karam, "Basics of Image and Video Compression," Qualcomm, San Diego, CA, 2007. Invited Two-Day Short Course.
- *Guest Speaker,* "Functional MRI," National Instruments, Austin, TX, 2007.
- *Invited Talk*, "Selective Error Detection for Error-Resilient Image Coding and Transmission using Similarity Check Functions," Ss Cyril and Methodius University, Skopje, Macedonia, 2006.
- *Guest Speaker,* "Freshman Introduction to Engineering," National Instruments, Austin, TX, 2005.
- *Invited Speaker,* "Wavelet-Based Adaptive Image Denoising with Edge Preservation," General Dynamics, Scottsdale, AZ, 2004.

- *Invited Talk*, "Teaching Image Processing to High School Students,'' IEEE Digital Signal Processing Workshop, Hunt, TX, 2000.
- *Invited Talk,* "Error-Resilient Video Coding with Channel-Optimized Trellis-Coded Quantization,'' IEEE Wireless Communications and Networking Conference, Chicago, IL, 2000.
- *Invited Talk*, "Channel-Optimized Source Coding for the Transmission of Digital Imagery over Noisy Channels," The American University of Beirut, Beirut, Lebanon, July 2000.
- *Invited Talk*, "Robust Image Coding Using Perceptually-Tuned Channel-Optimized Trellis-Coded Quantization,'' Midwest Symposium on Circuits and Systems, Las Cruces, NM, 1999.
- *Guest Speaker*, "Image Coding based on Perceptual Criteria," Motorola, Scottsdale, AZ, 1996.
- *Distinguished Lecture*, "Color Video Coding at Very Low Bit Rates," IEEE Signal Processing & Communications Chapter, Phoenix, AZ, 1995.

AWARDS AND RECOGNITION

- IEEE Fellow
- IEEE HKN Professional Member
- National Academy of Artificial Intelligence (NAAI) Elected Member (2025-present)
- AAIA (Asia-Pacific Artificial Intelligence Association) Fellow (2024-present)
- Editor-In-Chief, IEEE Journal on Selected Topics in Signal Processing (Jan 2019-Dec 2021)
- Invited Lecturer at DeepLearn 2022
- Invited Plenary/Keynote Speaker at the 2020 IEEE International Conference on Image Processing (IEEE ICIP)
- National Academy of Inventors, ASU Chapter (inducted in 2019)
- IEEE Region 6 "Outstanding IEEE member who promoted Women in Engineering" Award, 2018
- IEEE Phoenix Section Outstanding Contribution to Promoting Women in Engineering (WIE) Award, April 2018
- Certificate of Recognition, IEEE Signal Processing Society, September 2016
- IEEE Signal Processing Society's Best Paper Award (IEEE Transactions Journal Paper)
- IEEE Signal Processing Society's Board of Governors.
- QoMEX 2012 Best Paper Award, July 2012
- Intel Outstanding Researcher Award, March 2012
- Outstanding Faculty Award, IEEE Phoenix Section, February 2012
- American University of Beirut Distinguished Alumnus Award, 2011
- Certificate of Merit, IEEE Signal Processing Society, 2009
- Founding Member, US Representative, QUALINET, European Network on Quality of Experience in Multimedia Systems and Services (Founded in 2009), http://www.qualinet.eu/
- NASA Technical Innovation Award for work on visual coding, 2006
- Outstanding Technical Contributions Award, Digital Signal Processing, IEEE Phoenix Section, Jan. 2005.
- Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), January 2003.
- Professional Leadership & Service Recognition from the IEEE Signal Processing and the IEEE Communications societies

- U.S. National Science Foundation CAREER Award for work on perceptual-based image/video coding
- Society of Women Engineers Outstanding Graduate Student Award at Georgia Tech

EDITORSHIP

- Editor-In-Chief, IEEE Journal on Selected Topics in Signal Processing (Jan 2019-Dec 2021).
- Lead Guest Editor, IEEE Signal Processing Magazine, Special Issues on Autonomous Driving (2019-2021)
- Senior Editorial Board, IEEE IoT Magazine (2021-2022)
- Editorial Board, IEEE Access (2019-2021)
- Chief Guest Editor for the Proceedings of the IEEE, Special Issue on Perceptual-Based Media Processing (2011-2013)
- Senior Editorial Board of the IEEE Signal Processing Magazine (2014-2019).
- Editorial Board of the IEEE Journal on Selected Topics in Signal Processing (2014-2017).
- Editorial Board, Foundation and Trends in Signal Processing (2006-present).
- Guest Editor for EURASIP Journal on Video Quality Metrics (2012-2013).
- Guest Editor for the IEEE Signal Processing Magazine, Special Issue on Multimedia Quality Assessment (2010-2011).
- Guest Editor for the EURASIP Journal on Image and Video Processing, Special Issue on Quality of Multimedia Experience (2009-2011).
- Lead Editor for the IEEE Journal on Selected Topics in Signal Processing, Special Issue on Visual Quality Assessment (2007-2009)
- Editorial Board of the IEEE Transactions on Image Processing (1999-2003 & 2006-2010)
- Editorial Board of the IEEE Signal Processing Letters (2004-2006)

CONFERENCE ACTIVITIES

- Keynote/Plenary Co-Chair, IEEE International Conference on Consumer Electronics (ICCE), 2026.
- Award Chair, IEEE International Conference on Image Processing (ICIP), 2025.
- Technical Program Committee/Reviewer, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024.
- Publicity Co-Chair, International Conference on Quality of Multimedia Experience (QoMEX), 2022.
- Awards Co-Chair, IEEE International Conference on Multimedia Information Processing and Retrieval (IEEE MIPR), 2022.
- Awards Co-Chair, IEEE International Conference on Image Processing, 2021.
- General Co-Chair of the IEEE International Conference of Multimedia and Expo (ICME), Shanghai, China, July 2019.
- General Chair of the 23rd IEEE International Conference on Image Processing (ICIP), Phoenix, AZ, September 2016.

- Initiator of the World's First Visual Innovation Award presented for the first time at IEEE ICIP 2016, and of the World's First Multimedia Star Innovator Award presented for the first time at IEEE ICME 2019.
- Initiator of the IEEE Xplore Open Paper Preview, which makes papers freely available open access prior to held conference and which results in higher impact for papers.
- Member of the IEEE ICME Steering Committee, 2016-2017.
- Member of the organizing committee of the QoMEX 2016 conference (Lisbon, Portugal).
- Area Chair, 2015 IEEE International Conference on Image Processing (ICIP) and 2015 IEEE International Conference on Circuits and Systems (IEEE CAS).
- General Chair (together with Jorge Caviedes) of the 2012 International Workshop on Video Processing and Quality Metrics for Consumer Electronics (VPQM), January 2012.
- General Chair (together with Ron Schafer) of the 2011 IEEE Digital Signal Processing and IEEE Signal Processing Education Workshops, Sedona, AZ, January 2011.
- Technical Program Chair (together with Thrasos Pappas) of the 2009 IEEE International Conference on Image Processing.
- Co-Founder (together with Touradj Ebrahimi, *EPFL*, Kahled El-Maleh and Gokce Dane, *Qualcomm*), of the International Workshop/Conference on Quality of Multimedia Experience (QoMEX). http://www.qomex.org
- Co-Founder (together with Jorge Caviedes, *Intel*, and Sanjit Mitra, *UCSB and USC*) of the International Workshop on Video Quality for Consumer Electronics (VPQM). http://www.vpqm.org
- Technical Program Chair (together with Gokce Dane) of the First International Workshop on Quality of Multimedia Experience (QoMEX 2009).
- Technical Program Chair of the First International Workshop on Video Quality for Consumer Electronics (VPQM 2005).
- Served on the Organizing Committees and on the Technical Committees of several other international conferences.

SCIENTIFIC AND PROFESSIONAL SOCIETY MEMBERSHIPS

- IEEE Fellow (2013-present)
- National Academy of Artificial Intelligence (NAAI) Elected Member (2025-present)
- AAIA (Asia-Pacific Artificial Intelligence Association) Fellow (2024-present)
- IEEE Industry Engagement Committee (IEC) and Chair of the IEEE IEC Industry Impact Factor (IIF) initiative (2024-present)
- IEEE Educational Activities Board (EAB) Liaison to IEEE IEC (2024-present)
- IEEE Computing in Science and Engineering (CiSE) Magazine Editoriall Board as IEEE Signal Processing Society Representative (2025-2026)
- IEEE Signal Processing Society Fellow Evaluation Committee (2025)
- IEEE Educational Activities Board (EAB) Faculty Resources Committee (2023-2024)
- IEEE James H. Mulligan, Jr., Education Medal Committee (2023-2025)
- IEEE TechRxiv Editorial Advisory Board (2022-present)

- IEEE Technical Activities Board (TAB)/Publication Services and Products Board (PSPB) Products and Services Committee (2023)
- IEEE Access Journal Senior Editorial Board (2019-2022)
- IEEE TechRxiv Advisory Board (2019-2021) and Ad-Hoc Committee Chair (2021)
- IEEE Signal Processing Society's Conference Board (2003-2005 & 2017-2018 & 2021)
- IEEE Signal Processing Society's Publications Board (2019-2021)
- IEEE Signal Processing Society's Awards Board (2019-2020)
- IEEE Journal of Selected Topics in Signal Processing Senior Editor Board (2019-2021)
- IEEE Circuits and Systems Society's Fellow Evaluation Committee (2018 – 2019)
- IEEE Signal Processing Society's Board of Governors (2016 - 2018)
- IEEE Signal Processing Society's TC Review Committee (2016 - 2017)
- IEEE Signal Processing Society's Image, Video, and Multidimensional Signal Processing (IVMSP) Technical Committee (2005-2011 & 2014-2020)
- IEEE Circuits and Systems (CAS) Society's DSP Technical Committee (1996-present)
- Member of the IEEE Publication Services and Products Board (PSPB) Strategic Planning Committee (2014-2016).
- Member of the Award Board and Initiator of the World's First Visual Innovation Award presented for the first time at IEEE ICIP 2016.
- Member of the IEEE Signal Processing Society's Multimedia Technical Committee (2011-2014).
- Member of the IEEE Signal Processing Society's Appointments and Nominations Committee (2011-2014).
- Elected Member and Vice Chair of the IEEE Signal Processing Society's Education Technical Committee (2010-2012).
- Member of the IEEE Signal Processing Society's Technical Directions Board (2008-2009), and Chair of its Diversity Committee (2009).
- Member of the IEEE Signal Processing Society, IEEE Circuits and Systems Society, and IEEE Communications Society.
- Member of the Institute of Electrical and Electronics Engineers (IEEE).

JOURNALS / PROPOSALS / PATENTS / PROGRAMS REVIEWER

- Reviewer for IEEE, Elsevier, and ACM journals
- Reviewer on NSF (USA) panels
- Reviewer for NSF (USA) grant proposals including SBIR proposals
- Reviewer for NSERC (Canada) grant proposals
- Reviewed grant proposals for national and international universities
- Reviewed DoD (USA) proposals
- Reviewer and consultant on patent validation and litigation
- Leader of Assessment of Engineering and Computer Science University Programs at the international level.

SELECT UNIVERSITY SERVICE

- Dean of Engineering, LAU (2020-2022)
- Computer Engineering Director, Industry Engagement, ASU (2018-2019)

- Initiated and led transdisciplinary initiatives on automated mobility and self-driving cars across four ASU campuses (Tempe, Downtown, Polytechnic, Washington DC) and across various schools and established academia-university-government partnerships, ASU (2017-2019)
- ADAS lead faculty advisor as part of the DoE/GM-sponsored Advanced Vehicular Technologies (AVTC) ECOCAR (EcoCAR3) Mobility Challenge, ASU (2017-2018)
- Established an ASU-Silicon Valley partnership and fellowship with TCL Research America as founding member (2018)
- Computer Engineering Program Chair, ASU (2016-2017)
- Helped in establishing two new transdisciplinary degree-granting graduate programs and served on their Graduate Program Committees (GPC) at ASU:
    - Computer Engineering (CEN): transdisciplinary program between 2 schools
    - Robotics and Autonomous Systems (RAS): transdisciplinary program between 4 schools
- University Promotion & Tenure Committee, ASU
- Engineering Dean's Faculty Advisory Council (DFAC), ASU

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2. Tinku Acharya, Lina J. Karam, and **Francescomaria Marino**, "Real-time Algorithms and Architectures for Coding Images Compressed by DWT-Based Techniques," US Patent 6,124,811. Filed 1998 by Intel. **Issued 2000.**
3. Glen P. Abousleman, **Tuyet-Trang Lam**, and Lina J. Karam, "Communication System and Method for Multi-Rate, Channel-Optimized Trellis-Coded Quantization," US Patent 6,717,990. Filed 2000 by Motorola. **Issued 2004.**
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5. Glen P. Abousleman, **Wei-Jung Chien** and Lina J. Karam, "Method and Apparatus for Network-Adaptive Video Coding," US Patent Application Publication No. 2008/0259796 A1. **Published October 2008**.
6. Lina J. Karam and **Asaad F. Said**, "Automatic Cell Migration and Proliferation Analysis," United States Patent 9,082,164. **Issued July 14, 2015.**
7. Lina J. Karam and **Samuel Dodge**, "Systems, Methods, and Media for Identifying Object Characteristics Based on Fixation Points," United States Patent 9,501,710 B2. **Issued November 22, 2016.**
8. Lina J. Karam and **Jinjin Li**, "Stereo Vision Measurement System and Method," United States Patent 9,704,232 B2. Full Patent Filed March 18, 2015. **Issued July 11, 2017. Technology Licensed by Intel through Arizona Technology Enterprises (AzTE).**
9. Lina J. Karam and **Tejas Borkar**, "Systems and Methods for Feature Corrections and Regeneration for Robust Sensing, Computer Vision, and Classification," United States Patent US11,0304,85. **Issued June 2021**.

10. Ali Fakih and Lina Karam, "Systems and Methods for Property Assessment," US Provisional Patent Application 63/595,182. Filed November 11, 2023.
11. Ali Fakih and Lina Karam, "Systems, Methods, and Media for Generating Documents Using Machine Learning," US Non-Provisional Utility Patent Application 18/935,418. Filed November 1, 2024.
12. Ali Fakih and Lina Karam, "Systems, Methods, and Media for Generating Documents Using Machine Learning," WO PCT Application PCT/US24/56544. Filed November 19, 2024.
13. Lina Jamil Karam and Narendra Kanayalal Gangwani, "Systems, Methods, and Media for Responding to a Natural Language Query," US Non-Provisional Utility Patent Application 19/255,724. Filed June 30, 2025.

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2. Lina J. Karam and **Naji Mounsef**, *Introduction to Engineering: A Starter's Guide With Hands-On Digital Multimedia Explorations and Robotics,* Morgan-Claypool, 2008.
3. Lina J. Karam and **Naji Mounsef**, *Introduction to Engineering: A Starter's Guide With Hands-On Analog Multimedia Explorations,* Morgan-Claypool, 2008.
4. Lina J. Karam, *Design of Complex Digital FIR Filters in the Chebyshev Sense*, Ph.D. Thesis, Georgia Institute of Technology, March 1995.

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2. **Nabil G. Sadaka** and Lina J. Karam, "Perceptually Driven Super-Resolution Techniques," in *Perceptual Digital Imaging: Methods and Applications*, Rastislav Lukac Editor, CRC Press/Taylor & Francis, 2012.
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2. Hamdan Abdellatef and Lina J. Karam, "Reduced-Complexity Convolutional Neural Network in the Compressed Domain," *Neural Networks*, vol. 169, pp. 555-571, Jan. 2024. Available at https://doi.org/10.1016/j.neunet.2023.10.020.

3. **Ruolei Ji** and Lina J. Karam, "Learning-based Visual Compression," *Foundations and Trends® in Computer Graphics and Vision*, vol. 15, no. 1, pp. 1-112, Jan. 2023.

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11. **Samuel F. Dodge** and Lina J. Karam, "Human and DNN Classification Performance on Images With Quality Distortions: A Comparative Study," ACM Transactions on Applied Perception, vol. 16, issue 2, 18 pages, March 2019; doi 10.1145/3306241.

12. **Charan D. Prakash**, Farshad Akhbari, and Lina J. Karam, "Robust Obstacle Detection for Advanced Driver Assistance Systems using Distortions of Inverse Perspective Mapping of a Monocular Camera," *Robotics and Autonomous Systems Journal,* vol. 114, pp. 172-186, 2019. *Note: The developed precursor real-time forward collision warning system prototype was demonstrated by our Intel industry collaborators at the 2015 Consumer Electronics Show (CES) in Las Vegas.*

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22. **Jinjin Li**, Bonnie L. Bennett, Lina J. Karam, and Jeffrey S. Pettinato, "Stereo Vision Based Automated Solder Ball Height and Substrate Coplanarity Inspection," *IEEE Transactions on Automation Science and Engineering*, vol. 13, no. 2, pp. 757-771, April 2016.

23. **Srenivas Varadarajan** and Lina J. Karam, "A No-Reference Texture Regularity Metric Based On Visual Saliency," *IEEE Transactions on Image Processing*, vol. 24, no. 9, pp. 2784-2796, Sep. 2015.

24. **Qian Xu, Srenivas Varadarajan**, Chaitali Chakrabarti, and Lina J. Karam, "A Distributed Canny Edge Detector: Algorithm and FPGA Implementation," *IEEE Transactions on Image Processing,* pp. 2944-2960, vol. 23, no. 7, Jul. 2014.

25. **Tong Zhu** and Lina J. Karam, "A No-Reference Objective Image Quality Metric based on Perceptually Weighted Local Noise," *EURASIP Journal on Image and Video Processing*, 2014 (8 pages). Available online: http://jivp.eurasipjournals.com/content/2014/1/5.

26. **Berkay Kanberoglu**, Nina Z. Moore, David Frakes, Lina J. Karam, Josef P. Debbins, Mark C. Preul, "Neuronavigation using Three-Dimensional Proton Magnetic Resonance Spectroscopy Data," *Stereotactic and Functional Neurosurgery*, pp. 306-314, vol. 92, no. 5, September 2014.

27. **Sin Lin Wu**, Jorge Caviedes, Lina Karam, and Ingrid Heynderickx, "The Effect of Applying 2D Enhancement Algorithms on 3D Video Content," *Hindawi Journal of Electrical and Computer Engineering*, 11 pages, 2014. Online at: http://dx.doi.org/10.1155/2014/601392.

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36. **Niranjan D. Narvekar** and Lina J. Karam, "A No-Reference Image Blur Metric Based on the Cumulative Probability of Blur Detection (CPBD)," *IEEE Transactions on Image Processing*, vol. 20, no. 9, pp. 2678-2682, Sep. 2011.

37. **Asaad F. Said**, Bonnie L. Bennett, Lina J. Karam, and Jeff Pettinato, "Automated Detection and Classification of Non-Wet Solder Joints," *IEEE Transactions on Automation Science and Engineering,* vol. 8, no. 1, pp. 67-80, Jan. 2011. *Note: The developed non-wet solder joints detection technology was granted a Divisional Recognition Award by Intel.*

38. **Asaad F. Said**, Bonnie L. Bennett, Lina J. Karam, and Jeff Pettinato, "Robust Automated Void Detection in Solder Balls and Joints," *OnBoard Technology Magazine*, *Issue of the Decade on Quality*, pp. 36-41, Sep. 2010.

39. **Wei-Jung Chien** and Lina J. Karam, "Transform-Domain Distributed Video Coding with Rate-Distortion Based Adaptive Quantization," *IET Image Processing Journal, Special Issue on Distributed Video Coding,* pages 340-354, vol. 3, no. 6, December 2009.

40. Lina J. Karam, **Ismail AlKamal**, Alan Gatherer, Gene Frantz, David Anderson, and Brian Evans, "Trends in Multi-Core DSP Platforms," *IEEE Signal Processing Magazine, Special Issue on Signal Processing on Platforms with Multiple Cores*, pp. 38-49, November 2009.

41. **Wei-Jung Chien** and Lina J. Karam, "BLAST-DVC: BitpLAne SelecTive Distributed Video Coding," *Springer Multimedia Tools and Applications Journal, Special Issue on Distributed Video Coding*, 20 pages, July 2009, DOI 10.1007/s11042-009-0314-8; pp. 437-456, 2010.

42. Lina J. Karam, Touradj Ebrahimi, Sheila Hemami, Thrasos Pappas, Robert Safranek, Zhou Wang, and Andrew B. Watson, "Introduction to the Special Issue on Visual Media Quality Assessment," *IEEE Journal on Special Topics in Signal Processing, Special Issue on Visual Media Quality Assessment*, vol. 3, no. 2, pp. 189-192, April 2009.

43. **Rony Ferzli** and Lina J. Karam, "A No-Reference Objective Image Sharpness Metric Based on the Notion of Just Noticeable Blur (JNB)," *IEEE Transactions on Image Processing*, vol. 18, no. 4, pp. 717-728, April 2009.

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on Special Topics in Signal Processing, Special Issue on Functional Magnetic Resonance Imaging, vol. 2, no. 6, pp. 828-838, Dec. 2008.

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Date: October 1997 – November 1998
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Affiliation: Associate Professor, Department of Electrical and Electronic Engineering, and Chair of Automation and Computer Engineering Program, Politecnico di Bari, Bari, Italy, and CEO, APulia Intelligent Systems, Italy.
https://www.linkedin.com/in/francescomaria-marino-b5676a24/

M.S. Graduates (25)

Venkatesh Balaji
Date: December 2019
Thesis Title: Driver Assistance System and Feedback for Hybrid Electric Vehicles Using Sensor Fusion

Affiliation: Mercedes-Benz Research and Development India; before: Lucid Motors, USA
https://www.linkedin.com/in/venkatesh-balaji/

Sai Prajwal Kotamraju
Date: December 2018
Thesis Title: Performance Evaluation of Object Proposal Generators for Salient Object Detection
Affiliation: Co-Founder and Head of Computer Vision, Automotus, Los Angeles, CA
https://www.linkedin.com/in/prajwal-kotamraju-55361194/

Vinay KashyapTakmulPurushothamaRaju
Date: December 2014
Thesis Title: Fisheye Camera Calibration and Applications
Affiliation: Intel, Chandler, AZ
https://www.linkedin.com/in/vinay-kashyap-2890/

Tejas Borkar
Date: December 2013
Thesis Title: Automated Animal Coloration Quantification in Digital Images using Colors and Skin Classification
Affiliation: received Ph.D. at ASU (under my supervision); Motional, Tempe, AZ (current)

Charan Prakash
Date: Spring 2012
Thesis Title: Camera Calibration using Adaptive Segmentation and Ellipse Fitting for Localizing Control Points
Affiliation: received PhD at ASU (under my supervision); Apple, San Jose, CA (current)

Nicholas Werth
Date: February 2011
Thesis Title: Synthetic Aperture Radar Image Formation via Sparse Decomposition
Affiliation: Lockheed Martin

Vijay Sundaram
Date: September 2010
Thesis Title: Fast Algorithms and Architectures for High Throughput Encoding in H.264/AVC
(Co-advised with Dr. Chaitali Chakrabarti)
Affiliation: Dolby Laboratories, USA; prebiously with Intel, Portland, OR
https://www.linkedin.com/in/sundaramvijay/

Adithya Murthy
Date: May 2010
Thesis Title: Matlab Based Framework for Image and Video Quality Evaluation
Affiliation: Intel, Chandler, AZ ; Qualcomm, San Diego, CA (current)

Vicente Molieri
Date: April 2010
Thesis Title: Genomic Sequence Clustering

Niranjan Narvekar
Date: December 2009
Thesis Title: Objective No-Reference Visual Blur Assessment
Affiliation: Apple, Cupertino, California; previously with Ambarella, Intel, and Dialogic
https://www.linkedin.com/in/niranjannarvekar/

(Steven) Chris Burns
Date: July 2009
Thesis Title: Real-Time Fixed-Point Wavelet-Based Image Compression
Affiliation: General Dynamics Decision Systems, AZ; Fujitsu, AZ; Intel, AZ; CoreKinect, AZ (current)
https://www.linkedin.com/in/chris-burns-57554616b/

Manal Jalloul
Date: June 2009 (American University of Beirut)
Thesis Title: Improving Side Information Generation in a Distributed Video Coding System
(Co-advised with Prof. M. Adnan Al-Alaoui at the American University of Beirut)
Affiliation: Co-Founder, AI Lab, Lebanon (current); Lecturer, AUB and LAU, Lebanon (current)

Berkay Kanberoglu
Date: December 2008
Thesis Title: Novel Tools and Techniques in Neurosurgical Planning
Affiliation: Pursued PhD at ASU; Intel, Chandler, AZ; Samsung Research, USA (current)
https://www.linkedin.com/in/berkay-kanberoglu/

Brian Lenoski
Date: May 2007
Thesis Title: Estimating the Autocorrelation of Functional Magnetic Resonance Imaging: Presurgical Mapping of Finger Movement and Reading Comprehension
Affiliation: Medical Numerics, Germantown, MD; Apple, USA; Modsy, USA (current)
https://www.linkedin.com/in/brian-lenoski/

Houssam Abbas
Date: May 2006
Thesis Title: Analysis and Suppression of Mosquito Noise in Compressed Video using Optimized Epsilon-Filters
Affiliation: Intel, Chandler, AZ; Pursued PhD in CS at ASU; Postdoc at University of Pennsylvania; Assistant Professor, Oregon State University, USA (current)
https://www.linkedin.com/in/houssam-abbas-725642a/

Juan Andrade Rodas
Date: July 2005
Thesis Title: Semi-Autonomous 3D Tracking
Affiliation: Professor and Director, School of Electronics and Telecommunications Engineering, University of Cuenca, Cuenca, Ecuador; Pursued PhD at ASU

Mahesh Subedar
Date: May 2004
Thesis Title: Scalable Embedded Region-Of-Interest based Image Coding
Affiliation: Intel, Chandler, AZ; Pursued PhD at ASU; Intel Labs, USA (current)

Muhammad Yasin
Date: December 2003
Thesis Title: Web-Based Two-Dimensional Signal Processing

Katherine Tyldesley
Date: May 2003
Thesis Title: Wireless Video Coding and Transmission over the Iridium Network
Affiliation: IBM, Tucson, AZ

Charles Q. Zhan
Date: May 2003
Thesis Title: Adaptive Wavelet-Based Image Denoising with Edge Preservation
Affiliation: Carvana, Tempe, AZ; previously with Honeywell, Phoenix, AZ; Pursued PhD at ASU; Keep, Tempe, AZ
https://www.linkedin.com/in/charles-zhan-30ab074/

Lei Gao
Date: May 2002
Thesis Title: Error-Resilient Image Coding and Transmission over Wireless Channels
Affiliation: Engineering Manager, General Electric – Aviation, USA; previously with Honeywell, Phoenix, AZ
https://www.linkedin.com/in/lei-gao-5b77494/

David Giguet
Date: December 2001
Thesis Title: Error-Resilient and Very Low Bit Rate Image Coding
Affiliation: Renault Software Labs, France; previously with Purple Labs, Chambery, France; SAGEMCOM, France; Avaya, France; Intel, France
https://www.linkedin.com/in/david-giguet-94915016/

Sumohana Channappayya
Date: December 2000
Thesis Title: Error-Resilient Image Coding and Transmission

Affiliation: Associate Professor at IIT Hyderabad, India; previously with Packet Video, San Diego, CA, Qualcomm, San Diego, CA, received Ph.D. at UT Austin (under the supervision of Prof. Al Bovik)
https://www.linkedin.com/in/sumohana-channappayya-0bba33/

Mohamad Owais Osmani
Date: December 1999
Thesis Title: Object-based Processing
Affiliation: Mythic, USA; previously with Intel, Chandler, AZ, Mentor Graphics, USA
https://www.linkedin.com/in/owais-o-4155289/

Tuyet-Trang (Snow) Lam
Date: August 1999
Thesis Title: Image Compression for Noisy Environments
Affiliation: received Ph.D. at ASU (under my supervision), now with Intel, Chandler, AZ
https://www.linkedin.com/in/tuyet-trang-snow-lam-7424041/

INSTRUCTION

New Courses Developed

1. EEE 598 Deep Learning for Media Processing and Understanding (developed in Spring 2018 and offered yearly)

This is a four-credit graduate-level course that covers the fundamentals of deep learning with applications to media classification, processing, restoration, compression, and generation. Examples of media include image, video, text, speech, and audio. This course also includes hands-on assignments and projects in Python.
Some of the topics covered include:

- Basic Concepts in Machine Learning
- Probability Basics
- Motivation for Deep Learning
- Deep Feedforward Networks
- Regularization for Deep Learning
- Optimization for Training Deep Models
- Recurrent and Recursive Nets
- Autoencoders, Generative Models, Generative Adversarial Networks
- Applications: Computer Vision, Image Generation, Image Compression, Video Processing, Natural Language Processing

2. EEE 508 Digital Image and Video Processing and Compression

This is a four-credit graduate-level course that covers the fundamentals of digital image perception, representation, processing, and compression and include hands-on assignemnts and projects in OpenCV/C/C++, Matlab, and Android Studio. Some of the topics covered include:

- Two-Dimensional Digital Signal Processing Basics
- Vision and Perception
- Light and Color Models

- Image Segmentation
- Image Enhancement
- Image Restoration
- Basic Concepts in Information Theory
- Scalar and Vector Quantization
- Rate Distortion Theory
- Image Transforms
- Predictive, Transform, and Subband Coding
- Motion Estimation
- Entropy Coding: Huffman and Arithmetic Coding
- Run-Length Coding
- JPEG and JPEG2000 Image Compression Standards
- Motion Estimation and Compensation
- ISO MPEG and ITU-T VCEG Video Compression Standards

3. EEE 507 Multidimensional Signal Processing

This is a three-credit graduate-level course that is concerned with understanding signals of more than one variable and with systems for processing them. The specific topics covered are:

- Multi-D Discrete-Time(Space) Signals and Systems
- Multi-D Sampling
- Multi-D Discrete Fourier Transform (DFT)
- Multi-D Finite Impulse Response (FIR) Digital Filters
- Multi-D Z-Transform
- Multi-D Infinite Impulse Response (IIR) Digital Filters
- Processing of Propagating Space-Time Signals
- Multi-D Signal Restoration and Reconstruction
- Medical Imaging

4. EEE 404/EEE 591 Real-Time Digital Signal Processing

This is a four-credit senior-level course that provides the students with knowledge and hands-on experience in translating DSP concepts into real-time software for embedded systems using fixed-point DSP boards (Freescale DSP56858 and TI TMS320C5510). In addition to two 75-minute lecture sessions per week, on-campus students meet weekly for a three-hour laboratory session under the guidance of a TA. On-line students can access and control the lab equipment, boards, and software remotely, and can develop and run real-time applications from their remote location using the lab equipment, hardware, and software through a user-friendly "virtual bench" interface. I secured funding for the development of this course from the Consortium for Embedded and Inter-Networking Technologies (CEINT), Motorola, Freescale, Texas Instruments, and Tektronix.

The lecture topics covered include:

- Real-Time Systems: Introduction and Basics
- Basic Concepts in Signals and Systems: signals, Analog-to-Digital/Digital-to-Analog conversion, sampling and aliasing, quantization, discrete-time representation, filtering

- Digital Signal Processor Architectures: Harvard architecture, special addressing modes, parallel instructions, pipelining, real-time programming, modern digital signal processor architectures, hardware interfacing
- Computer Arithmetic: fixed-point and floating-point numbers, integer arithmetic
- Finite-wordlength effects: quantization, overflow, saturation, scaling, rounding and truncation
- Fixed-point Digital Signal Processors
- Fast Fourier Transforms and Applications: DTFT, DFT, FFT, implementation complexity, linear convolution, circular convolution, fast convolution, Short-Time Fourier Transform and Spectogram
- Real-Time Multimedia and Communication Applications: speech processing, and/or audio processing , and/or image processing, and/or adaptive filtering, and/or modulation/demodulation, and/or matched filtering, and/or equalization.

The labs include:

- Lab 1: Overview of Hardware and Software Tools.
- Lab 2: Introduction to CodeWarrior.
- Lab 3: Introduction to the DSP56800E Assembly.
- Lab 4: Introduction to On-Chip Peripherals.
- Lab 5: Introduction to Processor Expert.
- Lab 6: Applications Using the DSP56858EVM CODEC.
- Lab 7: Real-Time Image Processing.
- Lab 8: Introduction to Code Composer Studio and TMS320C55x Assembly.
- Lab 9: Musical Notes Synthesis
- Lab 10: Introduction to On-Chip Peripherals and Music Equalizer
- Lab 11: Fast Fourier Transform
- Lab 12: Applications of Fast Fourier Transform (Spectrum Analysis and Speech Processing)
- Lab 13: Modem (optional)

5. EEE/CSE/FSE 101 Introduction to Engineering Design

This is a Freshman level course which was developed to include two 50-minute lectures per week and a 2-hour hands-on lab session per week under the supervision of a TA. In addition, the students work in teams on two 4-week projects (one of which is a Robotics project) that build on the lab experiments. I secured funding for the development of this course from National Instruments (cash and equipment in the amount of $120,000). The lecture component of this course was adapted from the previously taught ECE100 (Intro to Engineering Design) course. The lab component was fully developed from scratch as it was non-existent in the previous ECE100 course. The laboratory component of this course was designed to include hands-on lab experiments that expose entering freshman students to a wide range of areas in electrical and computer engineering including circuits, electronics, communications, analog and digital signal processing, digital image processing, computing hardware and software, embedded systems, robotics and control.

The developed labs include:

- Lab 1: Introduction to Circuits: NI ELVIS, Breadboard, Circuit elements
- Lab 2: Analog Audio Level Meter (using comparators)

- Lab 3: Noise Removal Using Analog Filters
- Lab 3: Analog Music Equalizer (using op-amps)
- Lab 4: Analog Music Composer (using 555 timers)
- Lab 5: Introduction to LabVIEW and SPEEDY-33
- Lab 6: Digital Audio Level Meter
- Lab 7: Noise Removal using Digital Filters
- Lab 8: Digital Music Equalizer
- Lab 9: Digital Music Composer
- Lab 10: Digital Sound Effects
- Lab 11: Introduction to Robotics
- Lab 12: Digital Image Processing Basics
- Lab 13: Webcam Applications
- Lab 14: Telephone
- Lab 15: Amplitude Modulation
- Lab 16: Modem