JORGE ENRIQUE CAVIEDES, PH.D.

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RESEARCH & DEVELOPMENT SCIENTIST
MEDIA PROCESSING & INTERACTION | COMPUTER VISION | INTELLIGENT SYSTEMS

Professor of Multimedia Information Systems and Video Processing. Industry pioneering R&D scientist with subject matter expertise developing high-end video processing, 3D, interactive systems, immersive communication and computer vision systems. Track record of driving technology innovations that revolutionize engineering efforts and advance the competitive position of global companies. With expertise in:

Multimedia Information Systems | Digital Signal Processing | Digital Image Processing | Interactive Media | Computer Vision
Signal Processing | Artificial Intelligence | Immersive Communication | Intelligent Control Systems

KEY DIFFERENTIATORS

- Strong record of service in the academic community as adjunct faculty, lecturer, visiting professor, and student advisor throughout entire career
- Leverages 20+ years of leadership experience as a Principal Engineer/ Principal Scientist; brings a unique ability to deliver state of the art technology to real products
- Hands-on technologist, frequent speaker, and respected technology thought leader with a strong portfolio of patents and publications
- Delivered four generations of video processing algorithms and architecture for Intel media System-on-Chips (SoCs)
- Key contributions include leading edge video processing algorithms, signal and visual quality metrics for intelligent/adaptive processing and control, and design of robust computer vision systems
- Expertise in conceptual distance metrics, decision support systems, mixed-initiative user interfaces, immersive user experience and case-based-reasoning

PROFESSIONAL OVERVIEW

ARIZONA STATE UNIVERSITY   2005-

***Adjunct Professor and Lecturer – Arizona State University** (2005-)*

Teaching: ECE 408 Multimedia Information systems, ECE 509 Digital Video Processing

Latest seminars/presentations:

Spine posture detection and correction using active and passive biofeedback, Oral Presentation at the 12th International Conference of the Society on Scoliosis Orthopaedic and Rehabilitation Treatment, SOSORT 2017, Lyon, France, May 2017.

Intelligent Control Systems Design and Application to Computer Vision Performance Improvement, SenSIP Seminar Series. https://www.facebook.com/ASU.SenSIP.Center/?pnref=story

Overview of Operational Requirements for No-Reference Video Quality Metrics, VQEG meeting March 2016, ftp://vqeg.its.bldrdoc.gov/Documents/VQEG_SanDiego_Feb16/MeetingFiles/

INTEL CORPORATION   2003-2015

***Principal Engineer – Computer Vision Group, Intel Labs** (2014-2015)*

Drove the design, development, execution, and implementation of scientific research projects to fuel Intel's growth in the areas of computing, communication, technology, and new business opportunity.

- Conducted seminal work on computer vision algorithms including signal quality and structural complexity metrics for adaptive control and performance optimization; depth processing for immersive media communication, and skin segmentation for computer vision applications.
- Pioneered the convergence of image processing and computer vision by pursuing applied research on adaptive pre-processing and control systems to improve system performance.
- Substantially improved task performance and robustness in face identification, recognition, and hand gesture recognition systems; achieved a ~30% reduction of false negatives and a ~80% reduction of false positives; reduced errors in hand

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gesture recognition by up to 70%. Collaterals include four US patent filings, three published papers, and Matlab prototypes.

Principal Engineer Video Processing Algorithms & Architectures; R&D Manager – Intel Architecture Group (2011-2013)

- Led a high performance team that delivered high end visual quality (HD/ ultra-HD) algorithms and set performance standards to non-traditional platforms such as PCs, Laptops, tablets, and smart phones.
- Successfully upgraded the Intel GPU media processing chain incorporating 4K up-conversion and frame rate conversion algorithms, content adaptive processing, and optimized configuration settings. Provided visual quality content and scoring methodology. Updated four versions of the system and created model for three future generations.
- Provided IP development expertise and validation support for the media processing components of Intel GPU.

Principal Engineer Video Processing Algorithms & Architectures; R&D Manager – Intel Digital Home Group (2003-2011)

- Led a research team in charge of development, and delivery of advanced video processing algorithms/architectures for Intel products, including full video processing pipe for four generations of media system-on-a-chip (SoCs).
- Developed cutting edge image/video processing algorithms including noise reduction, post-processing, enhancement, motion compensated deinterlacing & frame-rate conversion, and color/contrast enhancement.
- Spearheaded the formalization of the video processing IP development process from proof of concept to final product. Specified all deliverables and approval criteria including documentation, tests, and testing methods. Provided a triage workflow for field engineering to resolve visual quality issues.
- Established the first state-of-the art video processing R&D lab, including experimental setups with latest display technology, production studio video simulators, 3D & 4K support, and perceptual quality evaluation setup.
- Regarded as Intel's preeminent visual quality and video processing expert; provided expertise and contributions in video processing that enabled Intel SoCs to be highly ranked in the market by leading consumer electronics companies.
- Established and managed research contracts with RIT, ASU, UCSB.

PHILIPS RESEARCH USA	2001-2003

Principal Member Research Staff & Project Leader

Developed Objective Image Quality Metrics, patented methods to measure visual quality on digital images without a reference; conducted experimental validation and applied the metrics to control video processing, video chain optimization, and quality of service.

LABORATOIRE D'ELECTRONIQUE PHILIPS FRANCE	1999-2001

Principal Member Research Staff & Project Leader

Video post-processing to reduce compression artifacts, patented algorithms to reduce MPEG compression artifacts, conducted simulations and visual quality evaluations; lead sponsored research on human visual system modeling at University of Nantes and Caen. Member of Philips Digital TV Design project.

═ACADEMIC CAREER EXPERIENCE ═

ARIZONA STATE UNIVERSITY	Adjunct Professor (2005-Present)
UNIVERSITY OF THE ANDES	Fulbright Professor Medical Informatics
UC Santa Barbara	Ph.D. Thesis Committee Member (2004)
Universite de Nice-Sofia Antipolis	Ph.D. Thesis Jury (2000)

═EARLIER CAREER SUCCESS ═

PHILIPS RESEARCH USA	Senior Member Research Staff & Project Leader
PHILIPS RESEARCH USA / PHILIPS MEDICAL SYSTEMS	Knowledge-based Systems Architect & Developer

═ACADEMIC CREDENTIALS & PROFESSIONAL DEVELOPMENT ═

Ph.D., Biomedical Engineering	**VANDERBILT UNIVERSITY; NASHVILLE, TN**
Master of Science, Biomedical Engineering	**VANDERBILT UNIVERSITY; NASHVILLE, TN**
Bachelor of Science, Electrical Engineering	**UNIVERSIDAD DE LOS ANDES; BOGOTÁ, COLOMBIA**
Strategic Analysis for Leaders, Managing at Intel, Finance for Decision	INTEL CORPORATION
Making, Business Acumen, Strategy and Action,	THE LEADER'S VOICE PROGRAM
Medical Informatics & Computer Science – continuing education credits	COLUMBIA UNIVERSITY
International Computer Vision Summer School, ICVSS 2015	U. OF CAMBRIDGE, U. OF CATANIA

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══ *SELECTION OF PATENTS* ══

Caviedes; J. E., et al. "Joint enhancement of lightness, color and contrast of images and video." Patent 9,710,890. July 18, 2017.

Caviedes; J. E., et al. "Techniques for Context and Performance Adaptive Processing in Ultra Low-Power Computer Vision Systems." Patent 9,621,741. April 11, 2017.

Caviedes; J. E., et al. "Control of computer vision pre-processing based on image matching using structural similarity." Patent 9,613,294. April 4, 2017.

Caviedes; J. E., et al. "Control of video processing algorithms based on measured perceptual quality characteristics." Patent 8,994,882. March 31, 2015.

Caviedes; J. E., et al. "Frame rate conversion using motion estimation and compensation" Patent 8,724,022. May 13, 2014.

Caviedes; J. E., et al. "Method and apparatus to present three-dimensional video on a two-dimensional display driven by user interaction." Patent 9,641,800. May 2, 2017.

Caviedes; J. E., "No-reference video quality model" Patent 8,457,193. June 4, 2013.

-Holder of 39 US Patents and 40 Patents Pending, Full list Available Upon Request-

══ *SELECTION OF PUBLICATIONS* ══

J.E. Caviedes and A. Pivonka, "Spine posture detection and correction using active and passive biofeedback," 12th International Conference of the Society on Scoliosis Orthopaedic and Rehabilitation Treatment, SOSORT 2017, Lyon, France, May 2017.

S.L. Wu, J.E. Caviedes, L. Karam, and I. Heynderickx, The Effect of Applying 2D Enhancement Algorithms on 3D Video Content, Journal of Electrical and Computer Engineering, Volume 2014.

J.E. Caviedes, "The Evolution of Video Processing Technology and Its Main Drivers," Invited Paper, Proceedings of the IEEE, Vol. 100, No. 4, April 2012.

J.E. Caviedes and J. Cimino, Towards the development of a conceptual distance metric for the UMLS, Journal of Biomedical Informatics, 37 (2004), 77-85. <awarded most cited paper 4 years in a row 2011-2014.

J.E. Caviedes and F. Oberti, Measuring image enhancement and degradation without a reference, In Digital Video Image Quality and Perceptual Coding, H.R.Wu and K.R. Rao, eds. CRC Press by Taylor and Francis, 2006.

-Full list Available Upon Request-

══ *SELECTION OF INTERNATIONAL CONFERENCES & WORKSHOPS* ══

J.E. Caviedes and S.L. Wu, "A Practical Approach to Signal Quality Metrics for Computer Vision Applications," in Proceedings of VPQM15, Chandler, AZ, February 2015.

J.E. Caviedes, S.L. Wu, "Combining Computer Vision and Video Processing to Achieve Immersive Mobile Video Conferencing," in Proceedings of IEEE International Conference on Image Processing, ICIP 2014, Paris, France, October 2014.

J.E. Caviedes, S.L. Wu, and T. Lee, "An overview of immersive mobile videoconferencing system design and quality of experience," in Proceedings of VPQM14, Chandler, AZ, January 2014.

-Full list Available Upon Request-

══ *PROFESSIONAL RECOGNITION* ══

Intel Digital Home Group Divisional Recognition Award, 2008 | Intel Digital Home Group Divisional Recognition Award, 2005

══ *INDUSTRY RECOGNITION* ══

General Chair, First through Ninth International Workshop (2005-2015)	VIDEO PROCESSING AND QUALITY METRICS
Juror (2014)	2015 CES INNOVATION AWARDS
Co-editor (2011)	SPRINGER SIGNAL IMAGE AND VIDEO PROCESSING JOURNAL
Fellowship Nomination (2010)	IEEE FELLOWSHIP
Invited Speaker (2009)	IEEE CS SOCIETY PHOENIX CHAPTER
Technical Reviewer (2007)	ICME, ICIP, JALN
Technical Reviewer (2006)	IEEE TRANSACTIONS ON IMAGE PROCESSING, SIGNAL PROCESSING LETTERS
Technical Reviewer (2004)	JOURNAL OF BIOMEDICAL INFORMATICS
Ph.D. Thesis Committee Member (2004)	UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Co-editor (2004)	EURASIP JOURNAL IMAGE COMMUNICATION
Speaking Engagement (2002)	SARNOFF CORPORATION
Expert Assessor of International Standing (2002)	AUSTRALIAN RESEARCH COUNCIL

Jorge Enrique Caviedes, Ph.D.

Ph.D. Thesis Jury (2000)	UNIVERSITE DE NICE-SOPHIA ANTIPOLIS
Fulbright Scholar Award (1998)	UNIVERSITY OF THE ANDES IN BOGOTA, COLOMBIA

BOARD & PROFESSIONAL MEMBERSHIPS

Board Member	ITU'S VIDEO QUALITY EXPERTS GROUP
Senior Member	IEEE SOCIETY
Co-chair	ICCE 2008 SPECIAL SESSION
Chair, special session Objective Video Quality Metrics	ICIP

LANGUAGES

Fluent in English, Spanish, and French; intermediate Dutch