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# James J. Kosmach

## Summary of Qualifications

- Leader and technologist with 20+years of experience in developing overall strategy and guiding software development organizations
- Lead a team of computer vision engineers in the development of products with state of the art machine and deep learning algorithms
- Experienced innovator with eight issued patents and four patent applications in the areas of multimedia and digital communications.
- Expertise in multimedia algorithms and the architecture, implementation, and optimization of video codecs such as MPEG4/H.263, H.264, and WMV and their packaging into file storage and streaming formats such as ASF, MP4, RTSP/RTP, and HTTP Live Streaming (HLS).
- Led team of 15 codec engineers for 8 years to develop audio and video codecs such as WMA, MP3, GSM-AMR, GSM-AMR-WB, AAC, HE-AAC, H.263, MPEG-4, H.264, and WMV for embedded wireless devices. Codecs achieved world class performance and bit-error resiliency. Codecs shipped on hundreds of millions mobile handsets worldwide.
- Led the multimedia codec discussions between PacketVideo and Google with regards to the adoption of PacketVideo's OpenCore framework for the Open Handset Alliance's Android platform. Led codec team and worked closely with Google on the integration of PacketVideo's OpenCore framework into the Android platfrom.
- Member of Motorola Corporate R&D's first video signal processing team. Participated in MPEG-2 standardization. Filed patents on video encoding rate control algorithms. Performed ground breaking research on Overlapped Block Motion Compensation (OBMC).
- Performed research that led to a patent on the cryptographic protection of a data packet. Consulted with Motorola legal counsel during 2010-2012 for landmark cases against Apple, Microsoft, and RIM (BlackBerry). Traveled to Washington D.C. to testify before the ITC for the litigation.

## Education

Georgia Institute of Technology, Atlanta, Georgia
**Ph.D. in Electrical Engineering** 1998
Dissertation: "Soft Decision Decoding of Reed-Solomon Codes for Mobile Messaging Systems"

Georgia Institute of Technology, Atlanta, Georgia
**M.S. in Electrical Engineering** 1990
Specialization: DSP and Communications

Louisiana Tech University, Ruston, Louisiana
**B.S. in Electrical Engineering** 1988

## Professional Experience

**UIC**–Clinical Associate Professor, Dept of ECE, UIC, Chicago, IL 2018-Present

- Faculty member in the signal processing group
- Teach classes in computer vision, signals and systems, and probability

**Personify**–VP of Engineering Chicago, IL 2013-Present

- Lead an international team engineers developing computer vision algorithms and products
- Lead R&D team focused on machine learning with emphasis on computer vision applications
- Create a culture of product development best practices within the software development teams

- Manage and track IP portfolio – set IP strategy and policy for the company
- Instrumental lead role in a multimillion-dollar software licensing deal to Intel, Inc.

**PacketVideo**–Senior Director of Engineering San Diego, CA and Palatine, IL 2000-2013

- Led technical discussions with customers and internal design teams focused on the architecture, design, and deployment of PacketVideo multimedia technology on embedded consumer electronic and mobile devices. Develop system requirements and file patent applications. Contribute to the development of business opportunities with customers.
- Led PacketVideo and AT&T customer engagement and technical team discussions from the initial meetings to final deployment of PacketVideo's DLNA/UPNP software integration with the AT&T U-verse STB receiver that supports H.264 and AAC codec. Final product was heralded by AT&T as one of their success stories and presented at the AT&T Developer Summit in 2013.
- Led team of 15 codec engineers for 8 years located in Chicago, San Diego, India, and Thailand in the architecture, optimization, and implementation of highly efficient audio and video codecs such as WMA, MP3, GSM-AMR, GSM-AMR-WB, AAC, HE-AAC, H.263, MPEG-4, H.264, and WMV. Codecs were architected and developed from the ground up and implemented in highly optimized C-code/assembly for platforms such as ARM-7, ARM-9, ARM-11, and Cortex ARM microprocessors and TI-55x and C6x DSPs. The codecs performance and their resiliency to withstand packet loss was world class. The codecs were constantly evaluated and selected by many of the top tier handset OEMS and shipped on hundreds of millions of handsets worldwide.
- Led the multimedia codec discussions between PacketVideo and Google with regards to the adoption of PacketVideo's OpenCore framework for the Open Handset Alliance's Android platform. Led codec team and worked closely with Google on the integration of PacketVideo's OpenCore framework into the Android. Proposed to Google the integration advantages of the OpenMax interface for codecs for the Android platform. Worked closely with Google and Qualcomm on the integration of the HW accelerated codecs into the OpenCore solution and OpenMax for the first Android G1 handset.
- Coordinated multimedia and streaming discussions between PacketVideo and Microsoft for the incorporation of Windows Media codecs and MS RTSP/RTP and HTTP streaming into PacketVideo's architecture. Led multimedia team that optimized and integrated Windows Media Codecs and MS RTSP/RTP and ASF Streaming into PacketVideo's embedded handset solution that was deployed as Verizon's VCAST service. VCAST was the first solution to deploy WMA-Pro Low Bit Rate (LBR) audio and the largest non-Microsoft deployment of Microsoft DRM.

**Algorithms Research Engineer**–Motorola SPS and PCS, Austin, TX 1998-2000

- Led wireline research team in the development of algorithms for the Motorola CopperGold ADSL modem chipset. Performed research on Trellis Coded Modulation (TCM), Reed Solomon Codes, and Discrete Multi-Tone Modulation (DMT/OFDM). Invented and received a patent for this research effort.

**Consultant**–Self-employed part-time during Ph.D research, Atlanta, GA 1994-1996

- Developed SPW and BONeS simulation test-bed for the Motorola ReFLEX mobile messaging system
- Performed capacity and packet delay analyses for the ERMES mobile messaging protocol
- Performed research on channel coding and demodulation algorithms for the Motorola ReFLEX mobile messaging system. Invented and received two patents with Motorola regarding this work.

**Research Engineer**–Motorola Corporate R&D Labs, Schaumburg, IL 1990–1993

- Part of multi-disciplinary lab that performed Motorola's first research on image and video compression.
- Participated in MPEG-2 standardization by attending ANSI and ISO/MPEG meetings.
- Researched and implemented H.261, MPEG-1 and MPEG-2 video encoders and decoders. Worked on efficient C-code architecture and implementation, rate control algorithms, and motion estimation techniques. Invented and received two patents on adaptive rate control algorithms.
- Performed research on bit-error resilient and error concealment techniques for the wireless transmission of images and video. Investigated the bit error resilience of the Lapped Orthogonal Transform (LOT) in the transmission of images over a cellular network.

- Analyzed and evaluated fractal compression techniques and their application towards video compression and its usefulness in error prone networks.
- Performed groundbreaking research on Overlapped Block Motion Compensation (OBMC). Resulting work led to collaborative research with Michael Orchard of UIUC and the classic paper on OBMC.
- Performed research on packet data networks. Invented and received a strategic patent on the cryptographic protection of a data packet. Patent was used by Motorola/Google in their landmark patent infringement cases against Microsoft, Apple, and Research in Motion.

## Patents

- Kosmach, Jenkins, Gran, Sherwood, and Al-shaykh, "System and Method For Embedding Multimedia Controls and Indications in a Webpage," U.S. Patent Application No: 2013/Pending.
- Sherwood, Kosmach, Al-shaykh, June, and MacKay "System and Method for Using an Application on a Mobile Device to Transfer Internet Media Content," U.S. Patent Application No: 2012/0210205.
- Luessi, Katsaggelos, Veselinovic, Lengwehasatit, and Kosmach, “System and Method for Frame Interpolation for a Compressed Video Bitstream,” U.S. Patent Application No: 2010/0201870.
- Al-shaykh, Johnson, Rossi, Sonawane, Kosmach, and June, "System and Method for Receiving Broadcast Multimedia on a Mobile Device," U.S. Patent Application No: 2009/0083803.
- Kosmach and Fontaine, “Method and apparatus for assigning bit metrics for soft decision decoding,” U.S. Patent 7,054,386, May 30, 2006.
- Levin, Kosmach, and Djordjevic, “Method of identifying an improved configuration for a communication system using coding gain and an apparatus therefore,” U.S. Patent 6,625,777, September 23, 2003.
- Kosmach, “Method and apparatus for decoding a data packet,” U.S. Patent 5,996,110, Nov 30, 1999.
- Auyeung, Levine, Kosmach, “Method, rate controller, and system for preventing overflow and underflow of a decoder buffer in a video compression system,” U.S. Patent 5,677,969, October 14, 1997.
- Auyeung, Levine, and Kosmach, “Method and device for determining bit allocation in a video compression system,” U.S. Patent #5,506,686, April 9, 1996.
- Finkelstein, Kosmach, and Smolinske, “Method and apparatus for providing cryptographic protection of a data stream in a communication system,” U.S. Patent 5,319,712, June 7, 1994.

## Publications

- Kosmach, Lengwehasatit, Veselinovic, Sherwood, and Neff, "Introduction to the OpenCore Video Components Used in the Android Platform," 1st International Workshop on Video Coding and Video Processing, Shenzhen, China, November 26-28th, 2008.
- Tapia, Kosmach, Veselinovic, Sherwood, and Neff, "Introduction to the OpenCore Audio Components Used in the Android Platform," AES 34th International Conference, Jeju Island, Korea, Aug 28-30th, 2008.
- Kosmach and Wicker, "Reconfigurable Two–Stage Trellis Decoding for Reed–Solomon Codes," Proceedings of the International Conference on Communications, June 6–10, 1999, Vancouver, B.C. Canada.
- Kosmach and Wicker, "Algebraic–Sequential Reed–Solomon Trellis Decoding," Proceedings of the IEEE Vehicular Technology Conference, May 16 – 20, 1999, Houston, Texas.
- Kosmach, “Soft Decision Decoding of Reed Solomon Codes for Mobile Messaging Systems,” Ph.D. Dissertation, Georgia Institute of Technology, December 1998.
- Wicker and Kosmach, "Advances in the Soft Decision Decoding of Reed–Solomon Codes," Proceedings of the 1997 IEEE Pacific Rim Conference for Communications, Computers, and Signal Processing, Victoria, British Columbia, August 20 – 22, 1997.
- Auyueng, Kosmach, Orchard, and Kalafatis, “Overlapped block motion compensation,” SPIE Conference on Visual Communications and Image Processing Proceedings, vol. 1818, pp. 561-572, November 1992.

## Panels

- Senior Design Day Industry Judge, College of Engineering, Northern Illinois University, 2006-Present.
- Go Big on the Big Screen, AT&T Developer Summit, 2013, Las Vegas, Nevada
- Panel Expert on Multimedia Issues in an Embedded Design, Renesas Developer Conference 2008, San Diego, California.

## Academic Experience

**Industry M.S. Thesis Advisor**–Tampere University of Technology, Tampere, Finland 2009-2010

- Proposed and guided M.S. thesis research as an industry advisor
- Topi Santakivi, "Frame Rate Up-Conversion in Mobile Video," M.S. Thesis, Tampere University of Technology, Tampere, Finland, March, 2010.

**Industry M.S. Thesis Advisor**–Northwestern University, Evanston, Illinois 2006-2007

- Proposed and guided M.S. thesis research as an industry advisor
- Research led to filing a patent application
- Martin Luessi, "Motion Compensated Frame Rate Up Conversion," M.S. Electrical Engineering Master's Thesis, Northwestern University, Evanston, Illinois, December, 2007.

**Adjunct Faculty**–ECE Department, Northern Illinois University, DeKalb, Illinois 2005

- Taught a senior course in Digital Signal Processing

**Adjunct Faculty**–ECE Department, University of Texas, Austin, Texas 1998-2000

- Developed and instructed graduate courses in digital communications

**Instructor**–Universidad Catolica de Cordoba, Cordoba, Argentina 1997

- Created, developed, and instructed a three week graduate course on wireless communications

**Visiting Student Researcher**–Cornell University, Ithaca, NY 1996-1997

- Performed research in the area of error-control coding for wireless messaging systems

## Professional Memberships

IEEE Member