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Education

- 1998 –2002 Ph.D. Biomedical Engineering
University of Southern California, Los Angeles.
Adviser: Michael C. K. Khoo, Ph.D.
Area of study: Biomedical Signal Processing and Physiological Modeling
- 1998 –2000 M.S. Electrical Engineering (GPA: 4.0)
University of Southern California, Los Angeles.
Area of study: Advanced Signal and Imaging Processing
- 1996 –1997 Professional Dipl., Electrical Engineering
Catholic University of Peru. Department of Electrical Engineering.
Area of study: Signal processing and Fuzzy Control Theory
- 1991 –1996 B.S., Electrical Engineering
Catholic University of Peru. Department of Electrical Engineering.
Area of study: Digital and Analog Electronic Circuits and Systems, Control and Communication Systems, Digital Signal Processing.

Employment and Work Experience

- 04/04-Present **Department of Surgery, Cedars-Sinai Medical Center**, Los Angeles, CA
Biophotonics Research & Technology Development Laboratory
Research Scientist.

My current work involves designing analytical methods toward the development of an ultrasonic - guided time-resolved fluorescence spectroscopy (TR-LIFS) system for the localization and characterization of rupture-prone atherosclerotic plaques. The ultimate goal is to provide a surface map of the arterial wall, indicating differences in biochemical composition derived from the TR-LIFS and radio-frequency (RF) ultrasound signals, superimposed on 3D ultrasound images providing morphological information of the plaque. I am also involved in the development of effective diagnostic/classification algorithms to distinguish normal vs tumor brain tissue at the resection margins intraoperatively, based on the analysis of TR-LIFS signal from brain tissue. In addition, I'm developing novel analytical methods for fluorescence lifetime imaging microscopy (FLIM), to perform real-time imaging of molecular and sub-cellular events in living cells.

- 09/02-04/04 **Department of Surgery, Cedars-Sinai Medical Center**, Los Angeles, CA
Biophotonics Research & Technology Development Laboratory
Postdoctoral Research Fellow.

This work involved analytical and experimental research using pulsed lasers, spectroscopic instruments, optical fibers and solid detectors. I was responsible of developing and applying advanced signal/image processing and systems identification techniques for the analysis of fluorescence lifetime data, as means of probing complex living systems found in biology and medicine.

- 01/99-09/02 **Department of Biomedical Engineering, University of Southern California**, Los Angeles, CA.
Research Assistant.

Ph.D. dissertation: "Linear and nonlinear model-based assessment of autonomic control in Obstructive Sleep Apnea Syndrome (OSAS) during wakefulness and sleep." (Adviser: Michael C. K. Khoo, Ph.D). This project focused on the application of linear and nonlinear system identification technique to cardiorespiratory signals (instantaneous lung volume, heart rate and blood pressure variability), in order to improve the understanding of the effects of Obstructive Sleep Apnea Syndrome (OSAS) on the cardiovascular autonomic control. One of the main goals of this research was to develop

an improved noninvasive clinical method for the assessment of autonomic function in patients with sleep apnea during wakefulness and sleep. I was responsible for every aspect of the project including: the implementation of an experimental protocol and its conduction in OSAS patients and control subjects for cardiorespiratory signal acquisition during wakefulness and sleep; application of advanced digital signal processing and linear and nonlinear mathematical modeling techniques for the indirect assessment of autonomic function; and statistical analysis for the validation of the method.

01/97-07/98 **School of Medicine, Cayetano Heredia University, Lima-Peru**
Center of Engineering in Medical Equipment
Research Engineer.

This project involved the design of a less expensive (yet more suitable for the Peruvian market) version of a laparoscopic machine. This equipment controls abdominal pressure, and measures the volume and flow of gas entering the patient. A first prototype was developed and able to adequately perform essential functions during abdominal surgery. I was responsible for the electronic design of the equipment (data acquisition, control and interface).

03/96-09/97 **Department of Electrical Engineering. Catholic University of Peru**
Research Assistant.

This project involved the design and implementation of a close-loop fuzzy-logic based temperature control system for an electric oven, used as a teaching laboratory chemical reactor. A fuzzy control algorithm was developed in order to maintain the oven temperature at a fixed value. I was responsible for the development of the fuzzy control algorithms and the testing of the system.

Academic Appointments and Experience

08/02 – 12/02 **Department of Biomedical Engineering. University of Southern California, Los Angeles**
Teaching Assistant. Physiological Control Systems

08/98 – 12/98 **Department of Biomedical Engineering. University of Southern California, Los Angeles**
Teaching Assistant. Statistical Methods in Biomedical Engineering

03/97 – 07/98 **School of Electrical Engineering. San Marcos National University, Peru**
Assistant Professor. Digital Circuits I and II Laboratories, Fuzzy Control Theory.

08/95 – 07/98 **Department of Electrical Engineering. Catholic University of Peru**
Teaching Assistant. Principles of Electronics, Analog Circuits, Electronic Design, Computer Architecture, Microprocessor Principles, Digital Control Systems, Communication Systems, Digital Signal Processing, Electric Machines, Principles of Electronics Lab, Electronic Design Lab, Digital Circuits-Computer Architecture Lab

Awards

2002 **Student Member Travel Award.** Biomedical Engineering Society.

2001 **Annual Grodins Graduate Award** (for overall academic excellence and outstanding original research). Department of Biomedical Engineering, University of Southern California.

1999-2002 **Graduate Research Assistantship.** Department of Biomedical Engineering, University of Southern California.

1998 **Graduate Teaching Assistantship.** Department of Biomedical Engineering, University of Southern California.

1998 **Graduate University Fellowship.** Department of Bioengineering. University of Pennsylvania. (Declined).

Professional Affiliation

- IEEE Societies: Engineering in Medicine and Biology and Signal Processing.
- Biomedical Engineering Society.
- American Society for Laser Medicine and Surgery
- The National Honor Society of Phi Kappa Phi.

Publications

A. Refereed Journal

1. L. Marcu, **J. A. Jo**, Q. Fang, T. Papaioannou, A. Dorafshar, T. Reil, J.H. Qiao, D. Baker, M. C. Fishbein, J. A. Freischlag. In-Vivo Detection of Macrophages in a Rabbit Atherosclerotic Model by Time-Resolved Laser-Induced Fluorescence Spectroscopy. Atherosclerosis. Accepted, November 2004.
2. **J.A. Jo**, A. Blasi, E. Valladares, R. Juarez, A. Baydur and M.C.K. Khoo. Determinants of heart-rate variability in Obstructive Sleep Apnea Syndrome during wakefulness and sleep. AJP- Heart and Circulatory Physiology, Manuscript # H-01065-2003. Accepted Oct. 2004.
3. L. Marcu, **J. A. Jo**, P. V. Butte, W.H. Yong, B. K. Pikul, K. L. Black, R. C. Thompson, Fluorescence lifetime spectroscopy of glioblastoma multiforme, Photochemistry and Photobiology, 80(1): 98-103, 2004
4. **J. A. Jo**, Q. Fang, T. Papaioannou, L. Marcu. "Fast nonparametric deconvolution of fluorescence decay for analysis of biological systems." Journal of Biomedical Optics, Vol. 9(4):743-752, 2004
5. Q. Fang, T. Papaioannou, **J. Jo**, R. Vaitha, K. Shastry, and L. Marcu. "A time-domain laser-induced fluorescence apparatus for clinical diagnostics." Reviews of Scientific Instrument. 75(1):151-162, 2004
6. Blasi, **J.A. Jo**, E. Valladares, B.J. Morgan, J.B. Skatrud, M.C.K. Khoo. "Cardiovascular variability after arousal from sleep: time-varying spectral analysis." Journal of Applied Physiology 2003 95(4):1394-1404.
7. **J.A. Jo**, A. Blasi, E. Valladares, R. Juarez, A. Baydur and M.C.K. Khoo. "Model-based assessment of autonomic control in Obstructive Sleep Apnea Syndrome during sleep." Am. J. Respir. Crit. Care Med. 2003 167: 128-136.

Submitted – In preparation.

1. **J.A. Jo**, Q. Fang, T. Papaioannou, L. Marcu. Ultra-fast method for the analysis of fluorescence lifetime imaging microscopy based on the laguerre expansion technique. Submitted to: IEEE Journal of Selected Topics in Quantum Electronics and Biophotonics (January 2005).
2. A. Blasi, **J. A. Jo**, E. Valladares, R. Juarez, A. Baydur, M. C. K. Khoo. Time-varying closed-loop model of cardiovascular variability during transient arousal from sleep. Submitted to: IEEE Transactions on Biomedical Engineering (November 2004).
3. **J.A. Jo**, Q. Fang, T. Papaioannou, J. Qiao, M. C. Fishbein, A. Dorafshar, T. Reil, D. Baker, J. Freischlag, L. Marcu. Laguerre Based Methods of Time-Resolved Fluorescence Data Analysis: Application to in-vivo characterization and diagnosis of atherosclerotic lesions. To be submitted to Annals of Biomedical Engineering.
4. T. Papaioannou, Q. Fang, **J. A. Jo**, R. Vaitha, A. Dorafshar, T. Reil, J. Qian, M. C. Fishbein, J. Freischlag, L. Marcu. Validation of a time-resolved fluorescence spectroscopy apparatus: spectral-resolved fluorescence lifetime and fluorescence photobleaching of rabbit arterial wall, in-vivo and ex-vivo investigations. To be submitted to J. Biomedical Optics.

B. Conference Proceedings Papers and Abstracts

1. **J. A. Jo**, Q. Fang, T. Papaioannou, and L. Marcu. Laguerre nonparametric ultra-fast deconvolution technique for Fluorescence Lifetime Imaging Microscopy (FLIM): method and validation with synthetic data. SPIE Proc. 5701-03, Photonics West-BIOS, Jan. 2005.
2. Q. Fang, T. Vernier, Y. Sun, J. Wang, M. M. Thu, T. Papaioannou, **J. A. Jo**, M. Gundersen, and L. Marcu, "Picosecond fluorescence lifetime imaging microscope for imaging of living glioma cells," SPIE Proc. 5699A-05, Photonics West-BIOS, Jan. 2005.
3. L. Marcu, Q. Fang, **J. A. Jo**, T. Papaioannou, P. Butte, B.K. Pikul, W.H. Yong, K.L. Black, M. C. Fishbein, J. A. Freischlag, "Time-resolved fluorescence spectroscopy: application to clinical diagnosis of vulnerable atherosclerotic plaques and brain tumors," SPIE Proc. 5692-19, Photonics West-BIOS, Jan. 2005.
4. **J.A. Jo**, Q. Fang, T. Papaioannou, J. Qiao, M. C. Fishbein, A. Dorafshar, T. Reil, D. Baker, J. Freischlag, L. Marcu. "Novel Methods of Time-Resolved Fluorescence Data Analysis for In-Vivo Tissue Characterization: Application to Atherosclerosis." 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, California. September 2004. Vol. 1: 1372-1375.
5. **J.A. Jo**, Q. Fang, T. Papaioannou, L. Marcu. "Novel Ultra-Fast Deconvolution Method for Fluorescence Lifetime Imaging Microscopy Based on the Laguerre Expansion Technique." 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, California. September

2004. Vol. 1: 1271-1274.
6. A. Blasi, **J. A. Jo**, E. Valladares, R. Juarez, A. Baydur, M. C. K. Khoo. "Closed-loop minimal model analysis of the cardiovascular response to transient arousal from sleep in healthy humans." 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, California. September 2004. Vol. 1: 1271-1274.
 7. **J. A. Jo**, Q. Fang, T. Papaioannou, L. Marcu. "Laguerre nonparametric deconvolution technique of time-resolved fluorescence data: application to the prediction of concentrations in a mixture of biochemical components." SPIE Biomedical Optics 2004, San Jose, California. January 2004.
 8. Q. Fang, T. Papaioannou, **J. A. Jo**, R. Vaitha, A. Dorafshar, R. Reil, J. Qiao, M. C. Fishbein, J. A. Freischlag, L. Marcu. "Validation of a time-resolved fluorescence spectroscopy apparatus in a rabbit atherosclerotic model." Diagnostics and Therapeutic Cardiovascular Interventions, BIOS 2004, January 24, 2004, San Jose, CA.
 9. T. Papaioannou, Q. Fang, **J. A. Jo**, R. Vaitha, A. Dorafshar, R. Reil, J. Qiao, M. C. Fishbein, J. A. Freischlag, L. Marcu. "Time-resolved fluorescence spectroscopy and photobleaching of rabbit aortic wall: in-vivo vs. ex-vivo." Diagnostics and Therapeutic Cardiovascular Interventions, BIOS 2004, January 24, 2004, San Jose, CA.
 10. **J. A. Jo**, Q. Fang, T. Papaioannou, L. Marcu. "Nonparametric Analysis Of Time-Resolved Fluorescence Data Based On The Laguerre Expansion Technique." 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Cancun, Mexico. September 2003.
 11. **J. A. Jo**, M. C. K. Khoo, A. Blasi, A. Baydur, R. Juarez. "Nonlinear Assessment Of Autonomic Function In Obstructive Sleep Apnea During Long-Term CPAP Therapy." Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Cancun, Sept. 2003. Vol. 1: 346 – 349.
 12. A. Blasi, **J. Jo**, E. Valladares, R. Juarez, A. Baydur, M. C. K. Khoo. "Time-Varying Analysis of Autonomic Control during Arousal from Sleep in Obstructive Sleep Apnea Syndrome." Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Cancun, Sept. 2003. Vol. 1: 350 – 353.
 13. L. Marcu, P. Butte, **J. A. Jo**, T. Papaioannou, Q. Fang, W. H Yong, R.C. Thompson, K. L. Black, and P.K. Pikul. "Lifetime fluorescence spectroscopy in neurological surgery." World Congress in Medical Biophysics and Biomedical Engineering, Sydney, Australia 2003.
 14. Marcu L, Q. Fang, T. Papaioannou, **J. A. Jo**, R. Vaitha, K. Shastry. "Portable lifetime fluorescence apparatus for clinical investigations of tissues." Diagnostic Optical Spectroscopy, The European Conference on Biomedical Optics, Munich, Germany. June 2003.
 15. L. Marcu, P. Butte, **J.A. Jo**, T. Papaioannou, Q. Fang, B.K. Pikul, R.C Thompson, W.H. Yong, K.L. Black. "Time-resolved fluorescence spectroscopy as tool for neurological surgery." Diagnostic Optical Spectroscopy, The European Conference on Biomedical Optics, Munich, Germany. June 2003.
 16. A. Blasi, **J. A. Jo**, E. Valladares, R. Juarez, A. Baydur, M.C.K. Khoo. "Abnormal cardiovascular responses to non-respiratory arousals in obstructive sleep apnea syndrome". APSS 2003, Chicago, Illinois. June 2003.
 17. L. Marcu, Q. Fang, T. Papaioannou, **J. A. Jo**, P. Butte, B. Pikul, R. C. Thompson, W. H. Yong, K. L. Black, J. A. Freischlag, M. C. Fishbein, M. A. Gundersen. "Lifetime fluorescence spectroscopy for in-vivo diagnosis of tissues." Keystone Symposia in Optical Imaging: Applications to Biology and Medicine, Taos, New Mexico Feb. 11-16, 2003.
 18. Q. Fang, T. Papaioannou, **J.A. Jo**, K. Shastry, R. Vaithe, L. Marcu. "Compact and mobile time-resolved laser-induced fluorescence spectroscopy system for clinical investigation." Lasers Surg Med, S15: 53, 2003.
 19. Fang Q., Papaioannou T., Vaitha R., Shastry K., **Jo J.A.**, Marcu L. "Development of a Compact Time-Resolved Laser-Induced Fluorescence Spectroscopic System for Clinical Investigations of Diseased Tissues." In *Advanced biomedical and clinical diagnostic systems*, SPIE Proc. Vol. 4958, 2003.
 20. **J. A. Jo**, M. C. K. Khoo, A. Blasi, A. Baydur, R. Juarez. "Detection Of Autonomic Abnormality In Obstructive Sleep Apnea Using A Nonlinear Model Of Heart-Rate Variability." Proceedings of the Second Joint EMBS/BMES Conference, Texas, Oct. 2002. Vol. 2: 1525 – 1526.
 21. A. Blasi, **J. A. Jo**, A. Baydur, R. Juarez, M. C. K. Khoo. "Effects of arousal from sleep on autonomic cardiovascular control in obstructive sleep apnea syndrome." Proceedings of the Second Joint EMBS/BMES Conference, Texas, Oct. 2002. Vol. 2: 1554 – 1555.
 22. **J.A. Jo**, M.C.K.hoo, A. Blasi, A. Baydur, R. Juarez. "Nonlinear Modeling of heart rate variability in Obstructive Sleep Apnea." 4th International Workshop on Biosignal Interpretation, Como, Italy. June 2002.
 23. **J. A. Jo**, M. C. K. Khoo, A. Blasi, A. Baydur, R. Juarez. "Cardiovascular variability in Obstructive Sleep Apnea: a closed-loop analysis." Proceedings of the 23rd Annual International Conference of the IEEE

Engineering in Medicine and Biology Society, Istanbul, Oct, 2001. Vol. 1: 511 – 514.

24. **J.A. Jo**, A. Blasi, E. Valladares, R. Juarez, A. Baydur, L. Tsang, M.C.K. Khoo. "Determinants of heart-rate variability in Obstructive Sleep Apnea Syndrome (OSAS) during wakefulness and sleep." 2001 Annual Conference of the Biomedical Engineering Society, Durham, North Carolina. October 2001.
25. **J.A. Jo**, A. Blasi, E. Valladares, R. Juarez, A. Baydur, L. Tsang, M.C.K. Khoo. "Minimal model of heart rate variability in Obstructive Sleep Apnea Syndrome." XIII Bioengineering Argentine Congress, Tucumán, Argentina. September 2001.
26. **J.A. Jo**, A. Blasi, E. Valladares, R. Juarez, A. Baydur, M.C.K. Khoo. "Model-based assessment of autonomic control in Obstructive Sleep Apnea Syndrome (OSAS) during sleep." American Thoracic Society 97th International Conference, San Francisco, California. May 2001.

Patents

- US Patent Application filed, June 2003, "Method for fluorescence lifetime imaging microscopy and spectroscopy." J.A. Jo and L. Marcu.
- US Patent Application filed, July 2004, "A dual modality catheter for simultaneous ultrasonic and optical imaging." T. Papaioannou, Q. Fang, J. A. Jo, L. Marcu, K. K. Shung.

References

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