Carlos Torres | Electrical Engineering, Ph.D.
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Education

Doctor's of Philosophy (Ph.D.) — **University of California - Santa Barbara**
Advisor: *B. S. Manjunath, Ph.D.* — *2012–2017*
Electrical and Computer Engineering
Focus areas: Computer Vision and Machine Intelligence

Master's of Science (M.S.) — **University of California - Santa Barbara**
Electrical and Computer Engineering — *2009–2012*
Signal Processing, Control Systems, and Machine Intelligence

Dual Bachelor's of Science (B.S.) — **San Jose State University**
Electrical Engineering and Bioengineering — *2004–2009*
Signal Processing and Digital and Analog Circuit Design

Ph.D. Thesis

Title: *Multimodal Analytics for Healthcare.* – Press Coverage: MESH

Description: My Ph.D. thesis focuses on the design and implementation of methods to analyze and fuse multimodal sensor data (e.g., pressure, RGB, depth, termography). The socio-economic objective of my research is to transform healthcare practices from hospital-centered to patient-centered by processing objective clinical data. The methods produced work seamlessly with healthcare, and enabled applications that monitor work-flows and patient sleep motion patterns and correlate motion with patient recovery rates.

Experience

Industry

Mayachitra Inc. (MC) — **Santa Barbara, CA**
Senior Research Staff Member, (Mayachitra's site) — *August 2018 – Present*
I design highly accurate systems and algorithms for various defense, military, and intelligence agencies by combining classical machine learning and computer vision methods with the latest developments in artificial neural nets and deep learning. During my tenure at (MC) I served as Principal Investigator for the National Geospatial-Intelligence Agency (NGA) Phase I project: "deriving uncertainty estimates for automated observations of objects from aerial imagery"; and drafted award-winning grants to the Air-Force (AF), National Science Foundation (NSF), and National Institutes of Health (NIH).

Procore Technologies — **Carpinteria, CA**
Data Scientist IV & Machine Learning Researcher, (Procore's site) — *November 2016 – August 2018*
I design analysis processes for unstructured data and highly accurate timeliness and response-predictive models for Procore's construction management platform and internal churn, revenue, and performance forecasts. I create methods to analyze blueprint documents and technical drawings using computer vision and Natural Language Processing (NLP) principles. Methods are currently under review for publication and the basis of new services and patent applications.

Carpe Data (Formerly Social Intelligence) — **Santa Barbara, CA**
Chief Data Scientist, (Carpe's site) — *November 2015 – October 2016*
I developed statistical methods to analyze unstructured and uncertain web-footprint data to estimate insurance risk levels. I devised new methods to model and predict auto-loss, smoker, and claim type likelihoods from web footprint data. The solutions used NLP and ensemble methods and are now the core of Carpe's business.

Academic

UC Santa Barbara — **Santa Barbara, CA**
Graduate Student Researcher, Vision Research Laboratory (VRL's site) — *2010–2015*
I developed methods and algorithms for multimodal sensor analysis under the advisement of Professor Manjunath. My research tackled multimodal analysis of time-series data to autonomously monitor healthcare environments, workflows (activities and events), and patients (interactions and motion). Findings are published in journals and conferences.

San Jose State University **San Jose, CA**
Research Assistant, Egger's Laboratory (DKE's site) *2007–2009*
I designed experiments to quantify water and surface effects on protein folding under the supervision of Dr. Daryl K. Eggers. I synthesized modified TMOS (Sol-Gel) glasses for encapsulation and adsorption of proteins. I analyzed protein structure in and out of the test-glasses using CD and UV spectrometers. Findings produced two journals.

Georgia Institute of Technology **Atlanta, GA**
Summer Research Assistant, Healthcare Robotics Laboratory (HRL's site) *2008*
Under the supervision of Dr. Charles C. Kemp, I designed machine learning algorithms for El-E, the customized-robot, to place objects on flat surfaces using Python and C++. This work was presented at the NIH-ABRCMS conference.

Selected Awards & Fellowships

US-ARMY Seed-Grant Awarded **UC Santa Barbara**
Author: Multimodal Sensor Network *Dec 2013–May 2015*

National Science Foundation (NSF) **UC Santa Barbara**
Fellowship Recipient, Bridge-to-the-Doctorate *Sep 2009–Sep 2011*

National Institutes of Health (NIH) **San Jose State University**
Fellowship Recipient, Maximizing Access to Research Careers (MARC) *May 2007–May 2009*

Recent Publications & Community Involvement [Complete List]

Journals

- **Carlos Torres**, Jeffrey C. Fried, and B. S. Manjunath. *Healthcare Event and Activity Logging* In IEEE / EMBS Journal of Translational Engineering in Health and Medicine (JTEHM). Advanced Internet of Things in a Personalized Healthcare System: Validation, Analysis and Utilization. July 2018. [To Appear].
- **Carlos Torres**, Kennenth Rose, Jeffrey C. Fried, and B. S. Manjunath. *A Multiview Multimodal System for Monitoring Patient Sleep.* In IEEE Transactions on Multimedia. Emerging Areas: Healthcare, 2018. [pdf].

Conferences

- **Carlos Torres**, Archith J. Bency, Jeffrey C. Fried, and B. S. Manjunath. *RAM: Role Representation and Identification from combined Appearance and Activity Maps* In IEEE / ACM Int'l Conf. on Distributed Smart Cameras (ICDSC), 2017. Invited paper. [pdf]
- **Carlos Torres**, Kenneth Rose, Jeffrey C. Fried, and B. S. Manjunath. *DECU: Summarization of Patient Motion in the ICU.* In European Conf. on Computer Vision (ECCV), 2016. [ArXiv-pdf]
- **Carlos Torres**, Victor Fragoso, Scott D. Hammond, Jeffrey C. Fried, and B. S. Manjunath. *Eye-CU: Sleep Pose Classification for Healthcare using Multimodal Multiview Data.* In IEEE Proc. of the Winter Conf. on Applications of Computer Vision (WACV), 2016. [ArXiv-pdf]

Reviewer

- IEEE-PAMITC's Winter Conference on Applications of Computer Vision [WACV16] and [WACV19].
- ACM's Intelligent User Interfaces: Cyprus 2017. [IUI17] and Sonoma 2016. [IUI16].

Selected Technical Projects

Complete List of Projects (web)

- **Eye-CU - Monitoring Healthcare Environments**. A distributed network of smart sensor nodes to monitor hospital environments using Raspberry Pi devices, customized sensor drivers, and in-house communication and data acquisition and analysis software. Implemented in Python and C++.
- **Gaussian Mixture Models (GMMs) - Who is talking?:** Speaker identification using probabilistic methods and human speech processing techniques. Implemented in MATLAB & C++.

Relevant Skills [GitHub]

Programming: Bash, C/C++, Java, LaTeX, Linux, MATLAB, R, Python, SQL, SSH & Verilog 2001.

Misc: AWS, Flask, Git, HDF5, Keras, NLP, OpenCV, Pandas, RFCs, Scikit-Learn, Spark, TF & XGB.