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LIFE OBJECTIVE

To enjoy being part of building our future by advancing science and technology.

EDUCATION

CUNY The Graduate Center
Ph.D. in Computer Science, May 2018

CUNY City College of New York GPA: 3.77 (GSOE Graduate Citation)
M.S. in Computer Science, June 2011

CUNY City College of New York
B.E. in Computer Engineering, Fall 2009 GPA: 3.72 (Magna Cum Laude)

SUNY Westchester Community College
A.S. in Computer Science, Spring 2003 GPA: 3.94 (Dept. Salutatorian)

HONORS & AWARDS

- Great Minds in STEM (GMiS) scholarship sponsored by Intel [Oct. 2016]
- Ford Foundation Pre-Doctoral Fellowship [2012-2015]
- CCNY Mentoring Award as a student team in conjunction with Dr. Jizhong Xiao [May 2011]
- NSF Bridge to the Doctorate, STEM program funded by NSF/NYC-LSAMP [2010-2013]
- Honorable Mention: 2011 National Science Foundation Graduate Research Fellowship Program
- Google Scholarship awarded through the HSF [2010-2011]
- First Place in Design Competition (18th Intelligent Ground Vehicle Competition) [2010]
- General Motors Engineering Excellence Award through HACU [2008-2009]
- DMJM Harris Scholarship by the Grove School of Engineering at CCNY [2008-2009]
- Harold L. Drimmer Scholarship [2003]
- SUNY WCC Honors Program Graduate and President's List Recognition [2001–2003]
- Sub Lieutenant (reserve) of FAE & *valedictorian* of Colegio Técnico Aeronáutico *(Intl.)* [2000]

RELEVANT TECHNICAL SKILLS

- **Personal Source Code Repository (Public):** https://github.com/ubuntuslave
- **Programming Languages**: Python , C/C++, Java, MATLAB, BASH-script, x86 assembly
- **Hardware:** NVIDIA TX2/Xavior, Arduino, Raspberry Pi, PIC microcontrollers.
- **Development & Documentation**: Eclipse (IDE), LaTeX (typesetting), Doxygen (documentation), Git, Continuous Integration via Gitlab Enterprise, Docker, Scrum Agile development cycle.
- **APIs (libraries)**: OpenCV, PCL, Eigen, RTI DDS, Robotics Operating System
- **CAD:** SolidWorks and 3D Printing. **Scientific Software:** Mathematica, Geometry Expressions.

INDUSTRY WORK EXPERIENCE

06/04/2018 – Present **Aurora Flight Sciences, a Boeing Company** Cambridge, MA
Perception Engineer

- R&D of sensor systems for detection and avoidance of non-cooperative airborne targets.
- Implemented 3D LiDAR-based solutions for landing zone evaluation for VTOL aircrafts.
- Gained exposure to RADAR and ADS-B technology by developing sensor interfaces to applications.

RESEARCH EXPERIENCE

08/2016 – 07/2017 **3D SLAM Reconstruction** Mitsubishi Electric Research Laboratories, Cambridge, MA

- Developed algorithms for SLAM (simultaneous localization and mapping) and 3D reconstruction.

02/2010 – 05/2018 **Computer vision applied towards navigation systems** City College, NY

- Conducted research in 3-D computer vision-centric systems applied towards assistive localization and navigation of visually impaired people and autonomous ground and micro aerial vehicles (MAVs).

01/2010 – 05/2018 **Omnidirectional Depth Sensing with Catadioptric Rigs** CUNY City College, NY

- Developed various catadioptric rigs in folded configurations using conic mirrors (spherical, hyperbolical) separated by a baseline and a monocular camera inside the bottom mirror. The system approximates a single viewpoint with constraints in the design parameters. A complete globe of depth information can be obtained from the fusion of "omnistereo" (equator) and optical flow (poles).

02/2011 – 09/2012 **Leader of the Intelligent Ground Vehicle Competition Team known as City Autonomous Transportation Agent (CATA)** City College, NY

- Engineered an autonomous vehicle with a simplified electrical architecture (focusing in safety and usability) and by adopting a new software architecture based on the open-source Robotics Operating System (ROS) framework, which enforces modularity and guarantees maintainability and reusability.

Design Report: http://www.igvc.org/design/2011/City%20College%20of%20New%20York%20-%20CATA.pdf

10/2009 – 06/2010 **The 18th Annual Intelligent Ground Vehicle Competition (IGVC)** City College, NY
Awarded First Place in Design Category (June 4-7, 2010)

- Under direction of Dr. Jizhong Xiao, participated in the design of the City College's IGVC 2010 rover (CityALIEN) by incorporating a novel approach based on stereo and omnidirectional vision.
  Design Report: http://www.igvc.org/design/2010/City%20College%20of%20New%20York-%20City%20Alien.pdf
  Video Link: https://youtu.be/mHm1WIUUBzw

09/2009 – 01/2010 **MetroBotics Project funded by the NSF** CUNY Brooklyn College, NY
under the Research Experiences for Undergraduates (REU)

- Studied interaction of hybrid groups of virtual agents and robots through the Player/Stage interface.

Summer 2009 **Distributed Research Experience for Undergraduates** Brooklyn College, NY
from the Computer Research Association (CRA)

- Experimented with different types of small, educational robots such as, Mindstorms Robotics Invention System, IPRE Scribbler, and Surveyor SRV-1. Link: http://dreuarchive.cra.org/2009/Jaramillo
- Related source code located at http://ubuntuslave.github.io/Surveyor_Driver and http://ubuntuslave.github.io/SRVjoy

PUBLICATIONS

PH.D. THESIS

- C. Jaramillo, "Enhancing 3D Visual Odometry with Single-Camera Stereo Omnidirectional Systems" (2018). CUNY Academic Works. https://academicworks.cuny.edu/gc_etds/2787

JOURNAL ARTICLES

- C. Jaramillo, L. Yang, J. Muñoz, Y. Taguchi, J. Xiao, "Visual Odometry with a Single-Camera Stereo Omnidirectional System," *Machine Vision and Applications*, pp. 1-12, Accepted June 2019.
  Available via SpringerLink's Online First™ at TODO.
  Project webpage: https://ubuntuslave.github.io/project/vo_sos/
- C. Jaramillo, R. Valenti, L. Guo, J. Xiao, "Design and Analysis of a Single–Camera Omnistereo Sensor for Quadrotor Micro Aerial Vehicles (MAVs)," *MDPI Sensors*, Special Issue Sensors for Robots, Feb. 6, 2016.
  Open access link at http://www.mdpi.com/1424-8220/16/2/217
- I. Labutov, C. Jaramillo, J. Xiao, "Generating Near-Spherical Range Panoramas by Fusing Optical Flow and Stereo from a Single-Camera Folded Catadioptric Rig," *Machine Vision and Applications*, pp. 1-12, Aug. 2011.
  Available via SpringerLink's Online First™ at http://dx.doi.org/10.1007/s00138-011-0368-2

INTERNATIONAL CONFERENCES

- C. Jaramillo, Y. Taguchi, and C. Feng "Direct Multichannel Tracking," in International Conference on 3DVision *(3DV)*, 2017. *Video demo of DMT 3D Reconstruction:* https://youtu.be/WA55baA23Zs
- C. Jaramillo, R. Valenti, and J. Xiao "GUMS: A Generalized Unified Model for Stereo Omnidirectional Vision (Demonstrated via a Folded Catadioptric System)," in International Conference on Intelligent Robots and Systems *(IROS)*, 2016. *Video demo of GUMS calibration:* https://youtu.be/8c7fTHMSUFM
- R. Valenti, I. Dryanovski, C. Jaramillo, D. Perea Ström, and J. Xiao "Autonomous Quadrotor Flight Using Onboard RGB-D Visual Odometry," in *International Conference on Robotics and Automation (ICRA)*, 2014.
- C. Jaramillo, I. Dryanovski, R. Valenti, and J. Xiao, "6-DoF Pose Localization in 3D Point-Cloud Dense Maps Using a Monocular Camera," in *IEEE International Conference on Robotics and Biomimetics (ROBIO)*, 2013.
  Link: https://youtu.be/0O28HHFI4VU
- C. Jaramillo, L. Guo, and J. Xiao, "A Single-Camera Omni-Stereo Vision System for 3D Perception of Micro Aerial Vehicles (MAVs)," in *IEEE Intl. Conference on Industrial Electronics and Applications (ICIEA)*, 2013.
- I. Dryanovski, C. Jaramillo, and J. Xiao, "Incremental Registration of RGB-D Images," in *International Conference on Robotics and Automation (ICRA)*, 2012.
- I. Labutov, C. Jaramillo, and J. Xiao, "Fusing Optical Flow and Stereo in a Spherical Depth Panorama Using a Single-Camera Folded Catadioptric Rig," in *International Conference on Robotics and Automation (ICRA)*, 2011
  **Best Computer Vision Paper – Finalist **

INTERNATIONAL WORKSHOPS

- I. Labutov, C. Jaramillo, and J. Xiao, "Generating Near-Spherical Probabilistic Range Panoramas Using a Low-Cost, Single-Camera Catadioptric-Stereo Rig." in *The 10th Workshop on Omnidirectional Vision, Camera Networks and Non-classical Cameras (OMNIVIS 2010)* (June 27, 2010), Zaragoza, Spain
  http://people.csail.mit.edu/koch/omnivis2010/awards.html **Best Presentation Award**

JUNIOR CONFERENCES

- I. Labutov, C. Jaramillo, J. Xiao, "Novel Near-spherical Field-of-view Catadioptric Stereo Rig for Mobile Robots" in *Junior Scientist Conference,* 2010, Wien(www.tuwien.ac.at/jsc10/) **First Place in Masters Category**
- C. Jaramillo, "Omnidirectional-Stereo Vision for Robotics Navigation: Theory, Design and Implementation." *2013 Conference of Ford Fellows*, Washington DC (September 27-28, 2013)

- C. Jaramillo, "Estimating 3D Egomotion from Optical Flow Using a Spherical Omnidirectional Catadioptric Rig." *Emerging Researchers National (ERN) Conference in STEM*, Washington DC (February 24-26, 2011)
- C. Jaramillo, "Estimating Egomotion from a Monocular Camera." LSAMP Bridge to the Doctorate Retreat 2011, Tampa, Florida (January 13-15, 2011) **First Place on Research Presentations (Master's Category)**
- POSTER: C. Jaramillo, I. Labutov, and J. Xiao, "Estimating 3-D Egomotion from Optical Flow Using a Spherical Omnidirectional Catadioptric Rig" *Einsteins in the City 2011: An InternationalStudent Research Conference*, The City College of New York, New York (April 13-15, 2011)
- POSTER: C. Jaramillo, I. Labutov, and J. Xiao, "Generating Near-Spherical Probabilistic Range Panoramas Using a Low-Cost, Single-Camera Catadioptric-Stereo Rig" *Urban University Conference 2010*, Brookhaven National Laboratory, New York (April 23-24, 2010)

PATENTS

- *Title of Invention:* "Folded Catadioptric Sensor Using Spherical Mirrors." *Inventors*: C. Jaramillo, I. Labutov, and J. Xiao. *Status*: Provisional Patent filed via CUNY CTO on April 27, 2012

TEACHING-RELATED EXPERIENCE & DEVELOPMENT

STEM Robotics (CUNY City College STEM Institute, Summer 2015) New York, NY
In this intensive program for selective high school students who learned fundamentals of mobile robotics using the Raspberry Pi (computer) and Python programming language in order to actuate motors and poll sensor data (e.g. ultrasonic, infrared) and various electronic components. Ultimately, participants built robots to compete in an autonomous robot sumo tournament (youtu.be/6138-qjoD3Q)

CIS 212: Microcomputer Architecture (CUNY Lehman College, Spring 2014-Spring 2016) Bronx, NY
This requirement course provides a broad study of architecture of microcomputer systems with emphasis on CPU functionality, system bus & memory design and performance, secondary storage technologies and management, input/output peripherals (display and printer technologies), and network technologies. The course follows the Systems Architecture textbook by Stephen D. Burd.

CMP 230: Programming Methods I (CUNY Lehman College, Fall 2013) New York, NY
Introduced freshman students to structured computer programming using Python, a modern high-level programming language. Programming constructs such as console I/O, data types, variables, control structures, iteration, data structures, function definitions and calls, parameter passing, functional decomposition, object oriented programming, debugging and documentation techniques.

Scientific Teaching Workshop (CUNY Graduate Center, Summer 2013) Bronx, NY
Participated in a two-week NSF-sponsored CUNY Science Now Professional Development Workshop.

NASA/STEP Proyecto Access (Pre-freshman Engineering Program) Hostos Community College, NY
Summer 2010 Introduction to Computer Programming Using Alice and C/C++

Columbia Secondary School (Middle School) New York, NY
Spring 2010 Elective Course: Programming in C with Lego NXT Robots

PAST WORK EXPERIENCE

01/16/2006 – 01/16/2009 **Industrial Medicine Associates, P.C.** Tarrytown, NY
Information Technology Support / Junior Network and System Administrator

- Expertise in Local Area Network architectures (Small Office and entry-level CISCO routers)
- Windows Servers (Active Directory) and Microsoft Exchange Server system administration and backup
- Deployment of virtual technologies – VMware, VirtualBox, Qemu, and Xen
- Remote connectivity via Windows Terminal Services, CITRIX, and VNC technologies
- Assisted with purchases and testing of a large range of electronic equipment
- Configuration of PBX and Communication systems such as BES, TalkSwitch, NEC, and Asterisk VoIP
- On a daily basis, responsible for support calls for all the distinct type of medical businesses and their respective front-end web and a great diversity of software and hardware systems

08/2003 – 12/2005 **Westchester/Putnam Central Labor Body, AFL-CIO** White Plains, NY
Web Designer / Computer Support Technician

- Installed and supported software applications and the LAN infrastructure
- Maintained MS Access databases and their e-Activist Network of over 500 subscribers
- Implemented electronic mail merge, e-mail, and blast-fax for meetings and events
- Redesigned and maintained the organization's website (wpclb.org)

10/2001 – 12/2002 **SUNY Westchester Community College** Valhalla, NY
Computer Science Tutor on computer programming (C/C++, Java, and Visual Basic)

VOLUNTEER EXPERIENCE

- Judging at Lehman College's 24-Hour Hackathon on October 16 and 17, 2015.
- Fall 2015: Robotics mentor for the Computer Science and Mathematics Club of Lehman College.

NATURAL LANGUAGES

Fluent in English and Spanish.

OTHER INTERESTS, ACTIVITIES AND SOCIETIES

- IEEE Society Student Member (Professional)
- Member of the City College Robotics Club and the Autonomous Ground Vehicle Team (IGVC '09-'11)
- Honor Societies: Eta Kappa Nu (HKN), Beta Pi Chapter and Phi Beta Kappa (Gamma Chapter)
- Ex-member of the Omega Computer Science Club at Westchester Community College (2002)
- Electronics and Robotics hobbyist and open-source software/hardware enthusiast
- Musical interests: guitar, drumming, and keyboard.