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| **KEIRAN CANTILINA**  (e) [keirancantilina@gmail.com](mailto:keirancantilina@gmail.com)  (c) 908 334-7612  **\*\*\* PERSONAL PROJECT PORTFOLIO**: [**https://keirancantilina.github.io**](https://keirancantilina.github.io) **\*\*\*** | | | | |
| **PERSONAL STATEMENT** | My interests focus on solving problems by drawing on interdisciplinary knowledge and resources. I have a demonstrated history of using this knowledge to very quickly pick up complex electromechanical systems and new programming languages on the fly. I love to use quantitative methods to gain insight especially in contexts where biology, engineering and programming intersect. I have 5 years of experience contributing to a wide variety of bioengineering research. | | | |
| **EDUCATION** | **MS in Bioproducts and Biosystems Engineering**, University of Minnesota, June 2018 | | | |
|  | **BS in Biological Sciences**, Cornell University, May 2015 | | | |
| **RELEVANT EXPERIENCE** | **Senior Research Engineer –** *Cleveland Clinic Automated Surgical Robotics Lab* | | | Aug 2019 – |
| * Developed algorithms for real-time motion and force control of multi-robot surgical platforms * Wrote code to handle kinematics of 7-DOF redundant robotic arms to enable execution of secondary tasks (collision, singularity, and joint limit avoidance) * Wrote LabVIEW, C++, Python, and Java drivers for control of hardware (sensors and robots) * Wrote high-speed multithreaded UDP and TCP server/clients in Python, LabVIEW, C++, and Java for a coordinated multi-robot multi-sensor system * Upgraded vision system of extant surgical robot by sourcing new cameras, designing a mechanical adaptor for optics, and writing Python drivers to stream video feed to a VR headset * Designed and fast-prototyped novel robotic end-effectors * Implemented real time object recognition, localization, and depth-mapping using neural networks with OpenCV in Python * Implemented camera calibration and distortion correction with OpenCV in Python * Designed and executed experiments to quantify susceptibility of competing magnetic motion tracking systems to interference/field distortion from metallic objects * Invented a method for identifying non-purposeful movements in a recording of teleoperated surgical robotic movements | | | |
|  | **Instrumentation Engineering Grad Research Asst. -** *U of MN* | | Aug 2016 – May 2018 | |
|  | * Tested and characterized prototype water quality sensors and other devices using test equipment * Invented novel water conductivity sensors for Master’s thesis * Wrote scripts to do statistical analysis of large datasets * Wrote data mining scripts to fetch data from geostationary climate satellite systems * Managed project timelines and personnel (Gantt charts, project management software, etc.) * Reverse-engineered communication protocol and built replacement for proprietary water sampler programming cable * Upgraded sampler power supply circuits to be more robust and resistant to user error * Programmed, inspected, and repaired ISCO autonomous water samplers * Wrote image processing pipeline to automatically determine microplastic concentration in effluent from degraded artificial floating treatment wetlands | | | |
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|  | **Bioengineering Laboratory Service Tech -** *Cornell University* | | May 2015 – Jun 2016 | |
|  | * Instrument software/hardware design and troubleshooting * Experimental design consulting * Creation of data processing scripts and programs * Used ImageJ to develop automated colony counting image processing script * Provided laboratory members with full-time multidisciplinary support * Managed projects in coordination with other departments and lab groups | | | |
|  | **Plant Genetics Research Assistant –** *Nat’l Chung Hsing University, Taiwan* | | | May – Aug 2014 |
|  | * Planned and initiated a cloning project aimed to develop a viral cross-protection vector for Vietnam-strain Papaya ringspot virus (PRSV) * Became familiar with cross-cultural research contexts | | | |
|  | **Plant Bioinformatics Summer Intern –** *NYS Agricultural Research Station* | | | May – Aug 2013 |
|  | * Planned and contributed to cloning projects related to the improvement of Grapevine fanleaf virus (GFLV) as a virus induced gene silencing (VIGS) vector * Gained proficiency in confocal laser microscopy * Became familiar with UV photography | | | |
|  | **Plant Pathology Research Assistant –** *NYS Agricultural Research Station* | | | May – Aug 2012 |
|  | * Learned sequence analysis, primer design, and phylogenetic analysis * Ran mid-scale IC-RT-PCR and electrophoresis reactions, screening projects, and cloning projects * Learned laboratory greenhouse skills such as planting, transplanting, inoculating, seed collecting, and sample collecting * Created and presented poster to share research results with research station faculty | | | |
| **PAPERS** | * BAEF Research Thesis: Use of additive manufacturing methods for carillon “autospeelwerk” mechanisms. *Koninklijke Beiaardschool ‘Jef Denyn’ Bibliotheek,* (2019) * Absence of genetic selection in a pathogenic *Escherichia coli* strain exposed to the manure-amended soil environment. *PLOS ONE*,(2018). * Master’s Thesis: The Development of a Novel Capacitive Water Conductivity Sensor. *University of Minnesota Digital Conservancy*, (2018). * Genetic variability, evolution, and biological effects of grapevine fanleaf virus satellite RNAs. *Phytopathology*, (2013). | | | |
| **RELEVANT SKILLS** | Electronics/Mechanical  * 2D and 3D CAD (AutoCAD, Onshape/Solidworks, Inventor) * Parametric CAD techniques * Finite Element Analysis * Electronics design, reverse engineering, troubleshooting * PCB design and assembly (soldering, choosing components, etc.) * HF and VHF RF circuit and antenna design * Mechanical design for fast prototyping (3D printing, laser cutting, or waterjet) * Mechanical design for traditional machining * Use of test equipment * Use of power tools and standard shop equipment * Basic woodworking and welding | **Programming/Data Analysis**   * Languages: R, C++, Python, Java, LabVIEW, MATLAB, bash, ROS * Proficient in multithreading * TCP/UDP clients & servers * Design and implementation of software-hardware interfaces * Optimization of code for embedded hardware * Optimization of code for fast execution * Robotic control and motion planning * OpenCV machine vision and neural networks * Image processing and camera distortion calibration * Design of Experiments (DOE) * Data mining/web scraping * Statistical analysis of large datasets * Test method development * Data visualization | **Bio/Wet Lab**   * Conventional genetic engineering/cloning * Plant, bacterial, viral and soil DNA and RNA extraction * PCR, electrophoresis, ligation, primer & expression cassette design * Plant and bacterial transformation * Analysis of sequencing data * Brightfield, darkfield, dissecting, confocal, and laser scanning microscopy * Standard microbio skills (cell culture, pipetting, etc.) * Biosafety Level 2 training * Sterile technique, etc. * Greenhouse plant care | |
| **HONORS & AWARDS** | **Belgian American Education Foundation Fellowship** | | July 2018 – June 2019 | |
| Thesis: “Use of additive manufacturing methods for carillon “autospeelwerk” mechanisms.” Yearlong fellowship to study Belgium’s UNESCO-protected carillon culture at the Belgian Royal Carillon School. | | | |
|  | **Fulbright U.S. Student Researcher Grant**  Award declined in order to accept the BAEF Research Fellowship | | May 2018 | |
|  | **Diversity of Views and Experiences Fellowship**  Two-semester fellowship including tuition and stipend | | Aug 2016 – July 2017 | |
|  | **2015 Plant Biology Student Excellence Award**  Awarded by faculty of Cornell University Department of Plant Sciences | | May 2015 | |
| **LICENSES** | **Guild of Carilloneurs in North America**  Professional Carilloneur License (valid in North America) | | June 2019 | |
|  | **Mechelen Beiaardschool Eindediploma**  Professional Carilloneur License (valid in Europe) | | May 2019 | |
|  | **US FCC Amateur Radio License**  General Class Privileges, callsign KD2KQE | | March 2016 | |
| **REFERENCES** | Dr. Robb Colbrunn  Director, BioRobotics Core, Biomedical Engineering Department  Cleveland Clinic, Lerner Research Institute  ND-20, 2111 E 96th St, Cleveland, OH 44106  (216) 385-5914  [colbrur@ccf.org](mailto:colbrur@ccf.org)  Dane Kouttron  Staff Research Engineer, Plasma Science and Fusion Center  Massachusetts Institute of Technology  167 Albany St, Cambridge, MA 02139  (631) 978-1650  <kouttron@mit.edu>  Dr. M. Todd Walter  Professor of Ecohydrology, Department of Biological and Environmental Engineering  Cornell University  Riley-Robb Hall, Cornell University, Ithaca, NY 14850  (607) 255-2488  <mtw5@cornell.edu>  Dr. Peter Marchetto  Assistant Professor, Department of Bioproducts and Biosystems Engineering  University of Minnesota- Twin Cities  218 BioAgEng Building, 1390 Eckles Ave, St. Paul, MN 55208  (201) 403-5470  [pmarchet@umn.edu](mailto:pmarchet@umn.edu) | | | |

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