Akshiv Bansal

Software Engineer · Research and Development

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Education

University of British Columbia *Vancouver, Canada*

Bachelor of Applied Science, in Engineering Physics with Distinction *2013-2018*

Minor in Honors Mathematics; GPA: 86%; Dean's Honor List

Experience

Symbio Robotics *Emeryville, CA*

Senior Software Engineer, Framework *Nov 2021 - Present*

- Worked on a Robotic Platform for automated assembly using robots from vendors like ABB and UR
- Worked on logging, data analysis, and applications to understand large volumes of robotic data
- Worked on a force control application involving gear meshing using robots. Implemented the application using async zmq clients and servers

Johnson & Johnson, Robotics and Digital Solutions *Redwood City, CA*

Software Engineer, Tools and Infrastructure - Advanced Development *Feb 2020 - June 2021*

- Created libraries to provide high level logging capabilities in Python that plugged into low level C++ applications
- Wrote API for the rapid integration of new sensors to expand logging without needing additions to control chain
- Created testing infrastructure to manage test cases and data generated. Worked on streamlined pipeline for data definition, packing, upload, and processing
- Worked extensively with PyTest, Numpy, and Django libraries to build testing tools for use in automated manufacturing testing

Auris Health *Redwood City, CA*

Mechanical Engineer, Instruments - Advanced Development *Sept 2018 - Jan 2020*

- Created and documented multiple software libraries, working in Python (object orientated) environment
- Created and automated a suite of performance tests for surgical instruments used robot assisted laparoscopic surgery.
- Used Python and OptiTrack's api to create a library of tests, and functions which are now being used by various other engineers accomplish performance related tasks.
- Created a computer vision experiment to optimize end effector position and cable tension state
- Defined, tested, and refined instrument life models based initially on literature. Improved them using clinical data
- Designed bench-top experiments, including fixtures and sensor selection for electromechanical design validation.

General Fusion *Burnaby, BC*

Plasma Engineering Co-op *May 2017 - Aug 2017*

- Designed an ultrafast (<2ms) protective shutter to shield optical sensors from corrosive liquid metal splash.
- Explored and characterized high voltage symmetry measurements for rapid discharge coils.
- Built mechanical and electrical isolation of optical diagnostic equipment, in a volatile noisy environment.
- Assisted in the assembly, commissioning, and maintenance of ultra high vacuum vessels.

Avigilon *Vancouver, BC*

Systems Engineering Co-op *May 2016 - Dec 2016*

- Designed solution for mass detached area storage (petabyte scale), from design to manufacturing delivery.
- Delivered production code in an Agile work environment, writing primarily in Python and C++
- Field sized and qualification tested workstations, servers, and displays.
- Translated qualitative criteria to object performance metrics with automated and reproducible tests.
- Rewrote windows installers for all major Avigilon software packages

Other Experience

Engineering Physics Student Association and Engineering Undergraduate Society *UBC, Vancouver*

President and EUS Councilor *Sept 2016 - Aug 2017*

- Worked on building renewal project engaging students in feedback on design and priorities.
- Conducted several curriculum consultations with our council to improve the ENPH program
- Participated in council passing/amending policy, worked to distribute EUS awards.

UBC Solar *UBC, Vancouver*

Mechanical Team Lead and Co-Captain *Sept 2013 – Mar 2017*

- Lead mechanical team in design and fabrication, in-charge of a 15 person team. Responsible for effective workflow, managing communication, and ensuring progress on various design and fabrication related goals.
- Used SolidWorks to design motor mount, steering components, and brake housing to ASC specifications.
- Designed several candidates for the suspension of the vehicle, from which one was selected and fabricated.
- Conducted FEA on chassis using ANSYS, to verify hand calculations and ensure safety.

Alma Mater Society, Sustainability *UBC, Vancouver*

Sustainability Projects Manager *May 2015 - May 2016*

- Worked with the chief architect to implement a dashboard system for the AMS Student Nest.
- Worked with operational staff to address waste management needs of the Nest.
- Sat on committees at UBC to understand/address challenges like energy and student engagement.

Awards

UBC Major Entrance Scholarship, $40,000 scholarship to attend UBC, the maximum possible

Roy Nodwell Prize, For a senior capstone project project showcasing originality, professionalism, and industrial relevance

APSC 2018 Rising Star, Chosen by Applied Science UBC for making meaningful contributions to the betterment of society

Trek Excellence Scholarship, For continuing scholastic achievement

EUS Emblem Award, For contributions to the undergraduate governing society

Projects

Low Cost Syringe Pump *BC Children Hospital || July 2017 – January 2018*

- Created a low-cost syringe pump to improve anesthesia delivery in low-resource surgery environment, with input and consultation from field experts.
- Final component cost of $25, for flow-rates between 10-200 mL per hour.
- Designed 3D printable chassis, for use with generic syringe, actuated pneumatically controlled by a Raspberry Pi0. Implemented novel feedback scheme using the drug syringe as variable capacitor.

Autonomous Gantry Robot for Crop Monitoring *Ecoation Innovative Solutions Inc. || Sept 2016 – May 2017*

- Designed x, y, z adaptable/scalable gantry robot for moving a crop monitor around a greenhouse.
- Uses open source software for control, and relies on stepper/PMDC motors for actuation.
- The project was implemented at Van Belle nursery to improve their tree nursery analytics.

Other Projects *Self Guided || Various*

- Programmed, tested, debugged a PID driving controller, that switched between following a black line and IR emitters, to locate and mechanically lift targets out of a course
- Co-coordinated UBC chapter of Student Energy: worked on policy recommendation for electric vehicles at UBC, and cohosted the Powering Our Future conference on the future of energy with UBC350.
- Co-authored a scientific study “Isolation, Identification and Initial Fermentative Characterization of Fourteen Wild Yeast Strains from Pinot Noir Grapes Grown in the South Okanagan, British Columbia.”
- Co-created limemap.com using JS and HTML5, prototype collaborative POI database plotter: collection of objects and services located inside buildings, areas, and public spaces. Makes use of Google Maps API.
- Built a <$100 PCR machine using Arduino platform and prototyped parts.
- Modeled a speed bump power generator in MATLAB, and fabricated a working prototype for a bicycle.

Course Work

Relevant Courses Completed *UBC, Vancouver*

- **Math** - Graph Theory, Variational and Approximate Methods, Applied Partial Differential Equations, Real Anaylsis, Probability with Physical Applications, Partial Differential Equations, Linear Algebra, Complex Analysis(I/II), Mathematical Proofs
- **Physics** - Optics, Statistical Mechanics, Electromagnetic Theory, Classical Mechanics, Quantum Mechanics
- **ELEC** Semiconductors, **CPEN** Digital Systems and Microcomputers, Principals of Software Construction
- **MECH** Automatic Control, Mechanics of Materials, Mechanical Design(I/II)