Luke Wicent Sy

 https://www.lukesy.net **in** https://www.linkedin.com/lukesy lsy3   Permanent Residence Visa in Australia

SUMMARY

- 6 years industry experience working on medical devices, embedded systems, wearable sensors, and social infrastructure projects
- PhD in Biomedical Engineering working on motion capture, body sensor network, and wearable robotics
- Achieved academic excellence in machine learning, robotics, and electronics subjects, gaining a high distinction average
- Culturally adaptive as demonstrated by international work experience (JPN, US, AU, PH), and startups consulting work

WORK EXPERIENCE

Senior Biomedical and Software Engineer, Genesys Electronics Design   Nov. 2020 - Present
- Managed the electronics design and development of class IIb medical devices, ensuring processes are compliant to ISO 13485, IEC 60601-1, and IEC 62304; and that overall budget and timelines are met
- Engaged with a wide range of partners (e.g., academics, clinicians, medical device owner, industrial designers, engineers, and manufacturers) to comprehensively capture user requirements towards research translation. Lead the definition of system, electronics, software design, and manufacturing specifications with focus on building local R&D and manufacturing capability
- Lead software developer for Embedded Linux (i.e., Yocto) and cloud based solution offering (React, Node JS)
- Developed Misra C compliant firmwares for STM32, nRF52, and ESP32 (BLE and WiFi comms; SPI, I2C, and UART interface), and low level sensor drivers deployed on medical devices
- Wide experience of medical devices ranging from devices used in radiation therapy, rehabilitation, and blind guidance system

Systems and Software Engineer, Neuro Spine Clinic   Mar. 2020 - Nov. 2020
- Collaborated with clinicians to design a remote monitoring system using wearable devices for clinical research (>50 subjects)
- Translated user requirements to specifications, and single-handedly implemented whole system from edge (IMUs, Android Mobile and WearOS, Python Scikit, C3D) to cloud (Full Stack development with React, Javascript, Python Django, and AWS)

Research Assistant, UNSW Medical Robotics Laboratory   Nov. 2019 - Nov. 2020
- Developing a soft upper limb exoskeleton composed of soft actuators and sensors to provide 1 DoF force augmentation
- Manufactured and characterised state-of-the-art soft fluidic actuators from simple materials (e.g., rubber tubes), and demonstrated high level of dexterity during device fabrication

Demonstrator/Teaching Assistant, University of New South Wales   Mar. 2017 - May 2020
- Facilitated learning on classes of ~35 students with emphasis on independent thinking and connecting theory with applications
- Taught wide range of biomedical engineering courses (i.e., 9 courses reaching ~ 500 students) on signal processing, modelling, cardiovascular dynamics, biosensors and transducers, implantable bionics, and biomechanics

Technology Consulting Student Intern, Vantari VR   May 2020 - July 2020
- Collaborated with 3 co-interns and key company leaders to identify pivotal issues and propose high business impact solutions
- Led rapid prototyping (< 6 weeks) of proposed solution involving a hand pose tracker and automatic hand gesture recognition for VR clinical procedural training, developed with Unity (C#), Python Scikit-learn, and Leap Motion Controller

Project Coordinator, Toshiba Industrial Information and Communication Technology Solutions   Sep. 2014 - Feb. 2016
- Investigated company's product portfolio (~100) towards entering the North America market, and conducted analysis of product/market fit and possible go-to-market strategies
- Coordinated 3 pilot projects around cloud and IoT business between Japan HQ and US subsidiary, managing and negotiating through vastly different cultural, legal, and business processes

Embedded Software Engineer, Embedded R&D Division, Toshiba Solutions   Nov. 2011 - Sep. 2014
- Developed verification and validation tools undergoing stringent review process to ensure safety of automotive embedded systems (client is a top car manufacturer) and to comply with highly regulated Japanese industry standards
- Leveraged deep knowledge in assembly language and microcontroller architecture to construct microcontroller (SpecC) simulators with C/C++ for testing "worst case run time scenarios". Microcontroller models: R32C, V850E2, SH4
- Automated source code validation based on document specification through a C/C++ Bounded Model Checker
- Pioneered automated testing in engineering group of 10 to increase productivity (> 3 times) and product robustness

Software Engineer, icannhas Inc.   Apr. 2011 - Nov. 2011
- Created web apps powered by Python Django, HTML, and Javascript under Scrum methodology in teams of ~5

Student Research Assistant, UP Instrumentation Robotics and Control Laboratory   Jun. 2009 - Mar. 2011
- Restructured software architecture of a telehealth system (RxBox) deployed to 4 sites towards bringing healthcare to rural areas
- Devised telemetry modules of 4 remote weather stations for investigating coastal climate change impact (UP MSI ICE CREAM)

EDUCATION

Ph.D. in Biomedical Engineering, University of New South Wales Sydney   Jun. 2017 - Oct. 2021
Thesis: Estimating lower limb kinematics using a reduced sensor count.

M.S. in Computer Science, Georgia Institute of Technology   Aug. 2015 - May 2017
GPA: 4.0 (4.0); Major: Computational Perception and Robotics; High distinction on Machine Learning and Big Data subjects

MBA Course Works, Coursera (Online)   May 2015 - Aug. 2015
Learned business and entrepreneurship foundations (e.g., Intro to Financial Accounting, Marketing, Operations Management)

B.S. in Electronics and Communications Engineering, University of the Philippines Diliman   Jun. 2007 - Mar. 2011
GPA: 1.247 (1.0) Magna cum Laude; Top 1 of 86 graduates; Finished five years course in four years

WORKSHOPS

Introduction to Wearable Robotics Workshop   Oct. 2019, Mar. 2020
🌐 https://www.lukesy.net/docs/ieeeunswsb-exoarm/overview/
- Designed and facilitated three part workshop teaching $\sim$ 20 students CAD design (OnShape), microcontroller programming (Arduino and STM32 ARM), and human computer interface (Processing) towards making a (hard) exoskeleton arm

Competitive Programming Workshop   Jul. 2019 - Oct. 2019
🌐 https://www.lukesy.net/docs/ieeeunswsb-cpw/
- Conducted weekly programming training based on Steve Halim's CP book (e.g., graphs, number theory, dynamic programming)
- Organised mocked competitions (4-8 students) for IEEEXtreme, an international competition for students involving 5000+ teams

SKILLS

- **Programming Languages**: Python, Matlab, Java, C, C++, SQL, R, Assembly, Javascript, HTML, CSS
- **IT Infra**: AWS EC2, S3, Lex, EMR, Lambda; Azure VM; Windows, Linux (Ubuntu, Archlinux, Redhat)
- **Data Science/AI related**: pandas, scikit-learn, keras, matplotlib, openCV. **Embedded Systems**: Arduino, STM32
- **Others**: Eagle, KiCad, OnShape, Latex, COMSOL. **Language**: Filipino, English, Japanese (Prof.), German (Limited)
- **Hobbies**: Karate (Brown), Shorinji Kempo (Black), Badminton, Project Euler and UVa, collecting Coursera/edX certificates

FUNDING AND AWARDS

- **Industry Mentoring Network in STEM Mentee**, connects PhD students with industry leaders   Nov. 2019 - Dec. 2020
- **PLuS International Interdisciplinary Researchers Training Grant**, $\sim$ AU\$5000   Sep. 2018
- **University Postgraduate Award Ph.D. Scholarship**, $\sim$ AU\$131,000 across 3.5 years   Jun. 2017 - Dec. 2020

EXTRA CURRICULAR

Chair, IEEE UNSW Student Branch   2019
- Re-established society from in-active state to running 21 events and being awarded "Highly Commended New Club of the Year"

Advisory Board, President (2019), Filipino Student Council of NSW   2019 - 2020
- Managed newly founded NSW wide alliance of 6 Filipino (university) student societies, and established strategic partnerships
- Assisted AU wide fund-raising ($\sim$ AU\$3000) to send PPEs to protect at-risk COVID-19 medical front liners in the Philippines

First Place Award, IXL Innovation Olympics Fall   Dec. 2018
- Represented UNSW along with an interdisciplinary team of 6 members at the world's largest innovation consulting competition

RELEVANT PUBLICATIONS AND PATENTS

[1] L. Sy, N. H. Lovell, and S. J. Redmond, "Estimating lower body kinematics using a Lie group constrained extended Kalman filter and reduced imu count," *IEEE Sensors Journal*, pp. 1–1, 2021. DOI: 10.1109/JSEN.2021.3096078.

[2] L. Sy, M. Raitor, *et al.*, "Estimating lower limb kinematics using a reduced wearable sensor count," *IEEE Transactions on Biomedical Engineering*, pp. 1–10, Sep. 2020. DOI: 10.1109/TBME.2020.3026464.

[3] T. T. Hoang, L. Sy, *et al.*, "A wearable soft fabric sleeve for upper limb augmentation," *Sensors*, vol. 21, no. 22, p. 7638, 2021. DOI: 10.3390/s21227638.

[4] J. Huang, C. Osorio, and L. Sy, "An empirical evaluation of deep learning for ICD-9 code assignment using MIMIC-III clinical notes," *Computer Methods and Programs in Biomedicine*, vol. 177, pp. 141–153, Aug. 2019, 🔗 lsy3/clinical-notes-diagnosis-dl-nlp. DOI: 10.1016/j.cmpb.2019.05.024.

[5] C. Umeda, L. Sy, *et al.*, "Verification system, method, and program (decision table generation from source code)," 2016-143074, Aug. 8, 2016.

REFEREES

Available upon request