

Jone J Kim

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Objectives

- As an individual with 4+ years of engineering industry work experience, I am seeking *part/full-time work in Research & Development or Research*, in either academia or industry. My research motivations and interests include: neuroscience and consciousness, qualia, phenomenal field theory, intentionality, religious trauma, societal information semantics and dynamics (including the more casual/informal aspects of “memes”, street epistemology; as well as science & academia’s continued friendly relations to the public and dedication to intellectual rigour, and veritas), and *Characteristica universalis* and fusion with pragmatic/adaptative sides of Korean philosophy seen in such that of Sejong and scholars (“et al.”).
- I am a seasoned generalist driven by curiosity who is still open to fascinating possibilities of new theoretical/abstract discussions in science and mathematics. However ultimately, my focus is to make them more relatable, easier, intuitive, artistic, fun, practical and human-centric, especially as efforts on facilitating frontier scientific knowledge in relation to the public and especially the younger generation.
- I am interested in opportunities with employers who are friendly with support and/or accommodations for graduate studies.

Education

University of Waterloo Waterloo, ON
Honours Mechatronics Engineering (BASc) `13–`19 / Graduated

York University Toronto, ON
Honours Biomedical Sciences (BSc) `09–`13 / Completed 3rd year

Work Experience

Qualcomm `22/March–`23/April
ML/DSP Application Model Engineer (contract) Toronto, Canada

Summary — Evaluation, analysis and improvement on customer usecase based performance prediction models on neural-net/signal processing architecture (Snapdragon Hexagon NSP) using statistics and machine learning approach, improving customer firmware/hardware optimization insights.

VoyagerX `18/May–`18/Aug (4mo) & `19/Jul–`20/Jun (1yr)
Machine/Deep Learning Developer (co-op x1, contract x1) Seoul, South Korea

Summary — prototyping R&D of machine learning models, to be integrated into consumer applications.

Detail

- Prototyping of neuralnet / classical machine learning models as proof-of-concept. Given a set of desired requirements to be achieved, with references to literature as a starting coordinate.
- Building multi-CPU/GPU data processing pipelines for training data augmentation/generation.
- Once prototype was completed, pushed further R&D focused on model fine-tuning until it met the production-level requirements – optimization, quality, ‘impressiveness’.
- Such projects were often collaborated along with peer feedbacks and discussion, along with occasionally providing advices and guidance for newer interns.

Topics — Image feature extraction & regression; Image recovery & reconstruction; Audio feature extraction & classification; Video object segmentation & tracking (demo video: <https://vectors-of-qualia.net/projs/face-recovery>).

Tools — TensorFlow 1&2, Keras, TensorPack, OpenCV, TensorFlow.js, OpenGL (WebGL/GLSL), etc

University Health Network — HPC & Bioinformatics Department `17/Sep–Dec (4mo)

Bioinformatics Research Assistant (co-op)

Toronto, ON

Summary — Web application development for Toronto hospital bioinformatics network.

Topic 1 — Development of web data-visualization dashboard the biochemistry Laboratory Information Management System (LIMS) – Python Flask, Bokeh, MongoDB.

Topic 2 — Development of Apache/Flask web server platform, used for sharing clinical genomic data among Canadian hospitals nation-wide (CanDIG). Writing container (Docker, Singularity) and VM (Vagrant) provisioning scripts, along with server deployment scripts (Bash, Python).

Cognitive Systems Corp

16/Sep–Dec (4mo)

DSP & Algorithm Developer (co-op)

Waterloo, ON

Summary — Development of embedded DSP & distributed big-data processing applications.

Topic 1 — Development and optimization of an embedded DSP testing suite for LTE radio frequency signals, and periodic automatic runs – Bash, Matlab, Python, C, TeamCity

Topic 2 —

- Development of distributed data processing application on a local HPC supercomputing cluster; parsing massive JSON reports from a bigdata storage, reduction into summarized single readable tables in a new database – Apache Hadoop: HBase, Spark/Scala.
- **Achievement** — original processing which took 24 hrs+ on a single workstation was accelerated to 5-10 minutes; allowing the keep up with the constantly incoming massive data in the cluster.

ON Semiconductor — Medical Division

15/May–Aug (4mo) & 16/Jan–Apr (4mo)

DSP Applications Developer (co-op x2)

Waterloo, ON

Summary — embedded firmware development of a modular digital hearing aid platform on company's proprietary ultra-low power DSP architectures.

Detail — Participated in full life cycle of firmware engineering / development – writing engineering specification given set of requirements, sprint planning (Scrum/Agile), high-level simulation (Matlab), low-level implementation (Assembly), verification (writing unit-tests), validation, and optimization.

Topics — digital biquad filter designer; acoustic feedback transfer function measurement tool; white noise generator; audio mixer; human-machine interface; memory/profile switching and expansion.

Tools — Assembly, Matlab, C (ARM CM3 & Matlab C-coder), Python.

University of Waterloo — Faculty of Engineering & Dept. of Kinesiology

14/Sep–Dec (4mo)

Engineering Research Assistant (co-op)

Waterloo, ON

Summary — Research & development, and publication on a DSP filtering algorithm prototype.

Detail — Heuristical development of a signal processing algorithm (Matlab), filtering noisy 3D spacetime series data of Leap Motion Controller, a human hand-motion tracking device; to be tested for use as medical screening tool for neurological disorders in sports medicine, under Prof. J. Y. Tung.

Paper — Published a respective technical paper as a primary author, presented at a biomedical engineering conference (see below).

York University — Department of Biology

Toronto, ON

Biochemistry Research Assistant (x2)

10–11 & 11–13 (~3yr)

Summary — Research assistant of cellular protein structures (Proteomics Lab – Prof. L. Donaldson) & biochemical/circadian rhythms (Chronobiology Lab – Prof. P. Lakin-Thomas).

Lab 1 (Proteomics) — Conducting background wet-lab experiments as per protocols to assist the lab's research of protein structures via x-ray crystallography and NMR.

Lab 2 (Chronobiology) — Conducting wet-lab experiments and statistical analysis; growing cellular cultures to collect time-lapse photograph data, then using simple image signal processing techniques to

Identify biochemical periodicities related circadian rhythm.

Peer-reviewed Publications

- 1 *Kim, J.J., Gonzalez, D.A., Mintz, A., Roy, E.A., & Tung, J.Y. (2015). Motor Control Assessment using Leap Motion: Filtering Methods and Performance in Indoor and Outdoor Environments. IFMBE Proceedings, Springer, 2015.*

Summary of Technical Skills

General

- GNU/Linux & shell scripting (bash) — Ubuntu, Manjaro, CentOS, Alpine
- Documentation — Markdown, LaTeX/MathJax
- Source Version Control — Git, CVS, Perforce
- Collaboration Methodology— Agile, TDD (Test Driven Development), JIRA, etc.

Machine Learning (Classical / Neural)

- Python — PyTorch, TensorFlow 1 & 2, Keras, TensorPack, OpenCV, scikit-learn
- Vector Database — ChromaDB
- JavaScript/Web — TensorFlow.js, OpenCV.js

Scientific Computing – Digital Signal Processing / Control / Dynamic Systems

- Matlab/Simulink, GNU/Octave
- Python — NumPy, SciPy, Numba, Pandas, NetworkX, SymPy, matplotlib, seaborn, etc
- Computational Neuroscience — Python/Nengo (Neural Engineering Framework)

High Performance Computing – Big Data & Distributed Processing

- Apache Hadoop, Spark (w/ Scala), HBase on an in-house HPC cluster

Hardware/Embedded Research & Development

- Assembly (proprietary ultra-low power DSP architecture)
- C (Arduino, Keil Board, ARM Cortex, etc)
- Educational development boards (PIC microcontrollers, Beagle Bone Black, Raspberry Pi, etc)
- Mobile chip performance/power estimation data analysis and modelling

Network / Web / Cloud Development

- HTML/CSS/JavaScript/TypeScript, Webpack, NodeJS, Python/Flask, AWS EC2/S3
- Web App — React.js & Electron (exposure)
- Data Visualization — D3.js, Python/Bokeh
- Web video GPU rendering — WebGL/GLSL (OpenGL)
- Cloud development — AWS (S3, EC2)
- Server provisioning / orchestration — Ansible & shell scripts
 - Containers — Docker, Singularity
 - Virtual Machines — Vagrant

GUI Development

- PyQt (PySide6)
- React.js

Miscellaneous

- C++, C#, Java, Ruby (academic/exposure)
- Scientific/Fictional Arts: GIMP/Photoshop, Inkscape/Illustrator (+SVG editing), FFMPEG, Blender (+scripting), 3D printing.
- Philosophy (Natural, Analytic, Continental, Korean), Humanities, Arts
- English (fluent), Korean (fluent)

Selected Projects

mfs (Media File System)

`24-ongoing — Personal

- A generic file content & semantic similarity search engine and application. Create your own evolving custom searchable media file system using your own tags.
- 1) First order function: Search by media or their custom semantics (and/or interface) you have created, labelled and referenced, or simply have them labelled from publicly available pretrained models that will make prediction for you based on the data trained from www/global/public sample space. Currently supports text, image, audio, video (typical MIME).
- Self and/or cloud hostable (dockerizable) & extendable standalone application (batteries included) with a daemon, server and editor. Written with PyQt, React, PyTorch, ChromaDB. CC or copyleft expected.

voq

`22-ongoing — Personal

- A free/hackable Python 3 pip package for STEM students as well as artists.
- Targeted at providing practical tools (classes/functions) and graphical demos and applicative examples of STEM concepts, for both STEM and arts students who want to learn and understand the fundamentals and prefer a learning step-by-step/debuggable numerical examples and codebase to work off of.

Personal Research Cloud Development

`20- ongoing — Personal

- Server/network development as part of personal research workspace, data management/synchronization.
- Custom Network Attached Storage (NAS) with snapshots/backups, customized cloud storage, OpenVPN, GitLab, media server, etc.

Computational Neuroscience — Neurally Plausible Word Order Encoding

`19 — Academic

- Reproduced implementations of a neuroscience literature's method on encoding word orders into semantic vector space, modeled on dynamic systems of spiking neurons for simulation of neurobiological systems.

Blouw, P., & Eliasmith, C. (2013) A Neurally Plausible Encoding of Word Order Information into a Semantic Vector Space. Proc Annu Conf Cogn Sci Soc. 35. 1905-1910.

Audio DSP & Feedback Control System — Automatic Guitar Tuner

`18 — Academic Capstone

- Design and development of an automatic guitar tuner that can tune all six strings of an acoustic guitar simultaneously. Using basic audio signal processing and control feedback mechanism to rotate motors on six mechanical motors coupled to the six tuning knobs on guitar.
- Team collaboration on building embedded DSP / control system (Arduino), electromechanical design (digital circuits, motors, 3D printing CAD parts), and analog audio signal electronics circuitry.
- Practiced engineering design principles to approach the best and reasonable solution with constraints and limited resource and time.

References

- Available upon request.