Jesse Clark

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Permanently eligible to work in Australia and in the United States.

Employment

Geneus Technologies (深圳今是科技有限公司), Mountain View, California May 2023 – Present
Principal Algorithm Engineer
Developing software for nanopore DNA sequencing.

Roche Molecular Diagnostics, Santa Clara, California December 2019 – May 2023
Principal Software Engineer
Developed software for nanopore sequencing instruments. Worked with all aspects of primary DNA analysis, including molecule detection, level-calling, base-calling, quality metrics, and neural network training.

Adapted mature data science pipelines to meet the needs of new experiments. Coordinated data compatibility between wet-lab experimentalists, GPU-accelerated signal processing, machine learning model training, and circuit simulations. Created a waveform model in data-oriented Python, which allowed experiment design files to be used directly in analysis and simulations. Created data validation tools that allowed entire categories of errors to be caught before expending compute resources on analysis. Developed AirFlow pipelines with TypeScript/React frontends.

University of Technology, Sydney, Ultimo, New South Wales November 2014 – December 2019
Senior Software Engineer
Responsible for software operations for a RoboCup@Home team from its beginning until it won first place in a global competition. Established on-premises source control, automated testing, packaging, installation, launching, and diagnostics of robot applications, and trained team to use them.

Overhauled operations at The Innovation and Enterprise Research Lab to use modern source control, package management, and continuous integration. Organized the release of open-source software packages. Developed software for social robotics experiments. Presented research results at conferences.

Delivered lectures on iOS application development, digital forensics, SQL databases, neural networks, continuous integration, Docker containers, and web components. Developed curriculum and introduced automated evaluation of programming coursework. Mentored research students in fully-reproducible research methods. Mentored entrepreneurship students in rapid application development techniques.

Sydney Programming School, Mosman, New South Wales April 2015 – December 2019
Head of Teaching
Delivered programming lessons at an after-school program, as it grew from zero to over 1,000 students aged 8–13. This program has been well received and students can demonstrate new computational thinking skills. Developed curriculum for:

- Animation and Game Design with Scratch and Snap
- Computer Graphics with JavaScript
- Cryptography and Blockchain with Python
- Robotics with Arduino and Lego

Lesson plans are available for licensing.

Modus Ponens, LLC, Palo Alto, California
Self-owned Consulting Business
Founded a new business to develop web and mobile applications for Silicon Valley startups. Applied many cutting-edge technologies to deliver maximum value to clients. Led teams of local and remote designers and developers. Had contact with prominent venture capitalists.

- **Maverick Poker** 2014
  Implemented a data and permissions model in Firebase for an online Poker game. Trained staff in iOS development.
- **OneLessDesk** 2014
  Built a message-queue-based tool for business process management.
- **Destination Software** 2013 – 2014
  Head of Product Development
  Developed a high-availability e-commerce web server for the travel and hospitality industry. Implemented automated deployment and zero-downtime updates of Node.js and Riak servers. Supported web-accessible map/reduce queries of combined domain data and analytics data. Trained new developers in MVC and Agile methodologies.
- **GoBoldly** 2013
  Full-Stack Developer
  Implemented a novel isomorphic web application engine that works even in javascript-disabled environments, and progressively enhances based on available functionality. Implemented an iOS frontend and Parse.com backend for a geo-social networking app.
- **Scanadu** 2012
  Developed an iPhone application to capture images of flu test strips and interpret the results.
- **SolarCity** 2012
  Developed a Node.JS web application to display live sales metrics. Developed a C# Service Stack web application to display customer locations on a map.
- **The Burn-Zone** 2011 – 2012
  Managed overseas developers to create a realtime sports discussion game.
- **Robot Panda Productions** 2011
  Developed authentication process, remote procedure call API, and database schema for a political Facebook game.
- **Soundwave** 2011
  Developed a prototype iPad music education app to present to investors.
- **Schmoooz** 2011
  Developed a Node.js backend and an iPhone frontend for a geolocation-based chat service.
- **wherU** 2011
  Developed an iPhone frontend for a college campus check-in service.
- **Gabberface** 2010
  Optimized network and database performance for a PHP/MySQL Facebook search engine. Improved site performance by 7x, resulting in over 25% more traffic.
- **WoWGen** 2008
  Deployed a Ruby on Rails site to track and compare World of Warcraft player statistics, and associated administration tools. Developed an interpreter for dynamic character equipment formulas extracted from game data files.

NASA Ames Research Center, Moffett Field, California July 2007 – April 2011
Computer Scientist
Worked with the Human-Computer Interaction Research Group to develop innovative and highly dependable mission evaluation systems for the Space Shuttle, International Space Station, and Constellation programs. These systems were designed to enhance operator and astronaut safety and productivity. Acquired domain expertise and managed data-entry efforts to import legacy records. Implemented fulltext search, advanced relational search functionality, custom report formatting, and usability features for search interfaces. Deployed a continuous integration daemon. Established an automated testing framework.

NASA Goddard Space Flight Center, Greenbelt, Maryland June 2004 – June 2007
Computer Engineer
Developed robotics and graphics software to simulate contact dynamics for Hubble Space Telescope Servicing Mission 4. Used a FANUC industrial robot and a computer running a physics simulation to mimic the behavior

of a Canadarm, which is too lightweight to operate normally in Earth gravity. Used capacative sensors to guide robotic orientation, and summarized those sensors in a congressional design review.
Recovered legacy climate data from the Nimbus and TIROS projects. Wrote Perl scripts to correct for degradation and translate to modern formats. Visualized results in Mathematica.

Wheels of Zeus, Los Gatos, California 2003
Wrote PIC assembly code and laid out a printed circuitboard for a Segway key duplicator.

Institute for Computer Assisted Orthopaedic Surgery, Pittsburgh, Pennsylvania May 2002 – July 2002
Intern
Designed and developed a graphical user interface for hospital patient database management and integration with in-house tools. Developed a C program to align x-rays with CT scans to track implant drift over time. This used a 6-dimensional BFGS search based on 3-d models and DICOM data. Modified control hardware for use with computer systems in the operating room.

Refract Media, Los Gatos, California 1997 – 2000
Configured and maintained Linux servers for a web hosting company during the dot-com boom.

Board Membership

Johnson and Louise H. Clark Charitable Foundation, Saratoga, California April 2023 – Present
Treasurer
Managing financial accounts for a family-run charitable foundation.

Open-Source Software Publications

Published explorable explanations and examples of best practices in several frameworks, for use in instructional materials. Published various small packages for file format conversion, terminal graphics, and text markup.

- Zodiac — Isomorphic web application engine using Backbone and Riak
- Dwarf Fortress Tileset Previewer
- REXPaint Web Viewer
- Factorio Server Control Panel
- Series Odds Calculator
- Proscrastinator's Clock
- Text Perpendicularizer
- Incremental — Tamper-resistant polynomial timer based on closed-form maths
- Dungeon Diagrams — Daily puzzle game
- Bitburner Scripts — Original solutions to Bitburner programming puzzles, with detailed documentation
- Original solutions to Advent of Code programming puzzles, with visualizations and demonstrations of various programming paradigms

Worked with the open-source community to discover areas for improvement in popular software packages, implement those improvements and automated tests to verify them, and publish the results. Notable contributions:

- **ROS** — Preeminent Robot Operating System
- **Docker** — Application container engine
- **Metalsmith** — Static website generator (used to generate this HTML/PDF document)
- **Gulp.js** — Streaming build system
- **Handlebars.js** — Declarative template engine
- **Dust.js** — Asynchronous template engine
- **Rivets.js** — Frontend data binding library
- **Bugzilla** — Widely-used bug tracking system
- **Audacity** — Cross-platform audio software
- **Remi** — Remote interface for Python applications

Academic Publications

1. Jesse Clark; Lenore Blum (2004)**: Reversible Cellular Automata on Infinite Configurations**
   Presented at *Wolfram New Kind of Science 2004*.
2. Jesse Clark; Mary-Anne Williams**: Building a Content Management System with Static Site Generation Technology**
   In preparation for submission to the *ACM International Conference on Information and Knowledge Management*.
3. Xun Wang; Jesse Clark; Peter Gärdenfors; Mary-Anne Williams**: Human Interpretation of Robot Pointing**
   In preparation for submission to the *Human-Robot Interaction Conference*.
4. Tonkin, Meg; Vitale, J.; Ojha, Suman; Clark, Jesse; Pfeiffer, Sammy; Judge, William; Wang, Xun; Williams, Mary (2017)**: Embodiment, Privacy and Social Robots: May I Remember You?**
   Presented at International Conference on Social Robotics, Tsukuba, Japan
5. Herse, S.; Vitale, J.; Ebrahimian, D.; Tonkin, M.; Ojha, S.; Sidra, S.; Johnston, B.; Phillips, S.; Gudi, S. L. K. C.; Clark, J., *et al.* (2018)**: Bon Appetit! Robot Persuasion for Food Recommendation**
   ACM/IEEE International Conference on Human-Robot Interaction
6. Vitale J, Tonkin M, Herse S, Ojha S, Clark J, Williams M, Wang X, Judge W (2018)**: Be More Transparent and Users Will Like You: A Robot Privacy and User Experience Design Experiment**
   ACM/IEEE International Conference on Human-Robot Interaction
7. Sammy Pfeiffer, Daniel Ebrahimian, Sarita Herse, Tran Nhut Le, Suwen Leong, Bethany Lu, Katie Powell, Syed Ali Raza, Tian Sang, Ishan Sawant, Meg Tonkin, Christine Vinaviles, The Duc Vu, Qijun Yang, Richard Billingsley, Jesse Clark, Benjamin Johnston, Srinivas Madhisetty, Neil McLaren, Pavlos Peppas, Jonathan Vitale & Mary-Anne Williams (2019)**: UTS Unleashed! RoboCup@Home SSPL Champions 2019**
   RoboCup 2019: Robot World Cup XXIII

Education

Carnegie Mellon University, Pittsburgh, Pennsylvania May 2004
Bachelor of Science in Computer Science, Minor in Mathematical Sciences
(4-year degree with research component — equivalent to an Honours degree)
Coursework in systems programming, artificial intelligence, machine learning, cryptography, computational linguistics, bioinformatics. Systems programming experience, including implementation of a TCP/IP network stack, context-switching kernel, memory manager. Major research project developed a genetic algorithm to solve constrained optimization problems in Mathematica.