Sam **Kavanagh**

SOFTWARE DEVELOPER

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Education

Doctor of Philosophy, Computer Science *Auckland, New Zealand*

THE UNIVERSITY OF AUCKLAND *September 2014 - Present*

- Thesis topic: *Exploring the Potential of Virtual Reality in Education*.
  - Investigated and evaluated techniques for learning through virtual reality headsets.

BSc (Hons) with First Class Honours in Computer Science *Auckland, New Zealand*

THE UNIVERSITY OF AUCKLAND *January 2010 - December 2013*

- Awarded 3 first in course awards during honours year of study.
- ISOM Honour Roll, 2012
- Dissertation topic: *Attack Vectors for Aggressive Security Systems*.
  - Investigated the viability of web-based digital security counterattacks.

Skills

SUMMARY & PRIMARY TECHNICAL SKILLS

- Full stack modern web development: Strong understanding of architecture and technologies.
  - Substantial Angular (2+) and TypeScript experience, including Angular RxJS, & Angular Material Design.
  - Strong understanding of HTML5+CSS & Sass, MySQL.
  - Understanding of Java-based REST APIs: Spring/Springboot, Spring MVC, & Maven.
- DevOps: Strong understanding of modern processes and technologies.
  - Substantial experience with Docker, including Docker compose.
  - Strong understanding of source code management, version control technologies and related philosophies:
    - Git, GitHub, Git Flow, GitHub Flow, GitLab Flow.
    - Experience creating DevOps architecture solutions, and designing developer workflows for teams.
- APIs: Experience testing/documenting, and integrating external API services.
  - Experience working hands on with teams from external organizations to understand and integrate their APIs.
    - ServiceNow, Grouper, University of Auckland Project Database.
  - Postman: Created Center for eResearch Postman Team and Workspace.
    - This allowed the testing and documentation of APIs to be shared in real time among team developers.
    - Has since been shared with other organizations within the University of Auckland to support their own API development.
  - Swagger: Experience creating Swagger API documentation.
    - Created OpenAPI 3.0 (YAML) Swagger UI documentation for proposed Center for eResearch API, & hosted on SwaggerHub.
    - Experience designing formalized Swagger models to represent complex JSON payloads.
- Experience with virtual reality development.
  - Unity: game programming with C#, terrain design, importing/working with 3D Models in Unity.
  - Popular toolkits/frameworks for programming for the *HTC Vive*, *Oculus Rift*, and *Gear VR*, including *SteamVR* and *VRTK*.

OTHER PROGRAMMING

- Experience conducting research with Python + Pandas, & Jupyter Notebooks.
- Strong knowledge of bash/scripting.
- Familiar with fundamentals of JavaScript, and PHP + Laravel.
- Experience working with data modeling languages: JSON, XML, YAML.
- Experimented with simple Android development.

OTHER TOOLS & EXPERIENCE

- Strong understanding of pedagogical theory, designing educational tools, conducting educational research & comparative studies.
- Substantial experience and involvement working with researchers and research groups.
- Extensive experience running tutorials and teaching digital skills.
- 360° videos: experience with recording, editing and publishing for virtual reality headsets.
- Strong understanding of information security principles.
- Strong understanding of HCI-related principles.
- Familiar with a variety of documentation tools: LaTeX, MS Office, Markdown.

Work Experience

Research IT Specialist
Auckland, New Zealand

CENTER FOR ERESEARCH, UNIVERSITY OF AUCKLAND
March 2018 - Present

- Full stack web developer currently working on the Research Hub.
  - Primary technologies: Angular + Material Design + RxJS, Sass, Docker, Spring MVC, API integration and DevOps architecture.
  - Worked on designing future Research Hub DevOps architecture solutions, and team workflow for developers.
  - Supported internal and external teams at The University of Auckland to integrate their services into the Research Hub.
  - Assisted at the Software Carpentry educational workshop.

Teaching Assistant
Auckland, New Zealand

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF AUCKLAND
February 2014 - February 2018

- Worked as a marker, demonstrator, and tutor for numerous courses at the University of Auckland.
  - Courses include: CS101, CS105, CS111, CS230, CS314, CS340, CS345.
  - Created course slides and tutored web design component of CS345 (*Human Computer Interaction*).

Projects

INTERACTIVE EDUCATIONAL VIRTUAL REALITY GAME

- Designed, implemented, and evaluated a large multilevel interactive educational game programmed for the *HTC Vive* virtual reality headset.
- A converted version of this game was also created (with reprogrammed controls) to operate on a standard desktop PC using mouse and keyboard input.
- In total over an hours worth of gameplay content was created, using Unity + C#, and other popular VR-related frameworks/toolkits, including SteamVR and VRTK.

SIGN LANGUAGE RECOGNITION USING LEAP MOTION

- Funded by a summer scholarship at The University of Auckland.
- Successfully created a Java-based skeletal model that allowed the *Leap Motion* gesture recognition hardware to recognize New Zealand Sign Language.

EXTENSIBLE UNIVERSITY CHATROOM

- Created a Java-based GUI chatroom software (both client and server), that required no installation and allowed users to join (or create) chatrooms corresponding to different university courses.
- Although originally designed to facilitate student discussion, the software can easily be reused as a lightweight client+server chatroom bundle in any context.

AUTOMATED SOFTWARE TESTING ASSESSMENT SUITE

- Created a web-based assessment suite that allowed educators to easily create assignments that tested their students ability to perform software testing.
- The tool used a combination of PHP, MySQL, and Java to allow educators to write assessment Java programs for which they wished students to provide test cases for, and to specify the nature of these test cases (using the suite's custom API). Students could then browse and attempt provide test cases for these assignments.
- The PHP server kept track of activities using a MySQL database, and could create, compile, and run Java files in the backend, and pipe the results back to the web page.

Publications

CREATING 360° VIDEO: A CASE STUDY

- Kavanagh S., Luxton-Reilly, A., Wünsche, B., & Plimmer, B. (2016). In *Proceedings of the 28th Australasian Conference on Computer-Human Interaction - OzCHI '16* (pp. 34-39). New York, New York, USA: ACM Press.

A SYSTEMATIC REVIEW OF VIRTUAL REALITY IN EDUCATION

- Kavanagh S., Luxton-Reilly, A., Wünsche, B., & Plimmer, B. (2017). *Themes in Science and Technology Education* 10 (2) (pp. 85-119).

Interests

- Piano, MMA (Brazilian Jiu-Jitsu & Muay-Thai Kickboxing), Marathons, Sci-fi & Anime, eSports, Blockchain & Cryptocurrencies.

References

Dr. Andrew Luxton-Reilly *The University of Auckland*

Associate Professor *Department of Computer Science*

- Supervisor: Doctor of Philosophy, Computer Science
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