

## Samuel MARKS, PhD



### MODUS OPERANDI

Split my life in three: family; medical charity; and business. The unrelated-to-medicine business funds the first two. Focus is on open-source scalable engineering. Recently awarded an in-kind **grant worth \$3.2M** for neural compute processor access from Google.

### LINKS

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### CAREER CLIFF NOTES

◇ As a contractor working on unrelated sensor network metric aggregation, showed the largest communications company in Australia how to **save \$100M**;  
◇ Given the entire top floor of the JP Morgan building to go from nothing to a full product in the Natural Language Processing (NLP) industry (all my subcontractors, including postdoctoral computational linguists)... with the backing of a billionaire family. Company **acquired by calendly**;  
◇ Built a stock market analytics platform (for a high-net-worth individual);  
◇ Created deduplication algorithms and databases for helping one large bank—who bought another large bank—to join customer profiles (for a Venture Capital fund, who then proceeded to **raise \$60M** off this);  
◇ Engineered a distributed system for a blockchain company (my 'stock' in their company has since **gone up > 16000%**).

## EXPERIENCE

**Mass. Eye and Ear Infirmary / Harvard Medical School. 2021+**  
◇ Collaborating with ophthalmologists on initiating new medical diagnostic screening programmes that are wholly charitable, open-source, patent-free, and AI-driven; and analysing & modelling from historical data in preparation.

**DIRECTOR at Sydney Scientific. 2015+**  
◇ Engineering software for high-net-worth individuals, small companies, and venture capitalists. Open-source focus, creating compilers and distributed systems to scale from 1 user, 1 developer, and 1 device to millions of users, thousands of developers, and ten thousand servers.  
*NOTE: Firm purposefully avoids anything related to medicine so as to avoid actual—or perceived—conflicts of interest with charitable research.*

## EDUCATION

**FELLOWSHIP. Harvard Medical School. 2021+**  
◇ Here in Cambridge MA:  
• to analyse historical records to develop open-source predictive and interpretive models; and to  
• initiate new medical diagnostic screening programmes; analyse & learn from its results; and, perpetually  
• to run better, bigger screening programmes.

I am working with Professor David Friedman (Director of Glaucoma and Medical Director for Clinical Research and Co-Director of the Glaucoma Center of Excellence). All research is wholly charitable, open-source, and patent-free... with a view towards global screening (self-funded through my consultancy).

**DOCTOR OF PHILOSOPHY (Medicine). University of Sydney. 2015–2020**  
◇ Thesis title: *Facilitating large-scale glaucoma and diabetic retinopathy screening using novel technologies.*  
◇ Created technologies to facilitate mass-screening for blinding eye diseases glaucoma and diabetic retinopathy (DR). Namely:

- State of the Art (**SOTA**) **ML** results for differentiating glaucoma from nonglaucoma using the landmark Blue Mountains Eye Study (BMES) and REFUGE fundus photo datasets
- **SOTA ML** for differentiating DR from healthy on Singapore (GON) and a new dataset we collected (DR SPOC)
- **SOTA ML** for determining whether images are gradable on said new dataset↑
- 7 new smartphone ophthalmoscope designs; compared to the industry (\$6307–\$487); the last two of which were **under 1¢ [<\$0.01]** each.
- eLearning MOOCs to teach the basics of ophthalmology and fundus photo diagnostic interpretation to medical students
- Glaucoma risk calculator (online, interactive, with analytics dashboard)

Led to an ophthalmologist colleague's PhD [hdl.handle.net/2123/29364](https://hdl.handle.net/2123/29364) and an invitation to continue my research at Harvard Medical School / MEEI.

**BACHELOR OF SCIENCE. School of Computing. Macquarie U. 2010–2014**  
◇ This degree was in a wide range of subjects that supported my passion for computer science.

## OPEN-SOURCE

700+ repositories on GitHub, >300 of these original projects (not forks). Top-10 contributor to Google's Keras (2nd-most popular ML framework; with 13 million downloads per month; as of Feb 2025).