

# Greg Langmead, Ph.D.

## SUMMARY

I am a teammate and leader, mathematician and engineer, researcher and developer of shipping products. I want to give back and have an impact.

- Ph.D. in mathematics, in four-dimensional geometry and mathematical physics
- Machine learning, natural language processing, Java, Python, Spark, Swift
- Recent second mathematical career in homotopy type theory
- Successful leader, individual contributor, and collaborator
- Good listener, eager to teach and learn
- Long and successful track record integrating research into products

## EXPERIENCE

### **APPLE INC., PITTSBURGH, PA – 2011-PRESENT**

**MACHINE LEARNING ENGINEER, SERVICES, JANUARY 2014**

Founding member of Apple News algorithms team starting 2014. Designed and built entity linking and other algorithms to assign articles into topic feeds in reader app. Supervised bring-up of other algorithms such as clustering of articles and integration of heterogeneous topic taxonomies into knowledge base. Collaborator and catalyst for other components including search and personalization. Continuous iteration on accuracy of algorithms, expanding to Stocks app (2018) and French (2019). Leader when assessing scope and deciding priorities. Good intuition for fitting work to schedules.

Influential in maintaining a culture of transparency and accountability via metrics and education. Advocate for demystifying our work and maintaining close partnership with nontechnical teams such as editorial and program management. Adapted ambient engineering culture to research team. Vocal advocate for process changes. Generous with onboarding and mentoring. Many positive comments in peer and manager feedback.

**SOFTWARE ENGINEER, PRODUCTIVITY APPLICATIONS, JULY 2011**

Developed iOS and OS X software for designing and reading multi-touch books. Wrote Objective-C code, performed code reviews, and collaborated with other internal groups through three release cycles including the initial release of multi-touch features in January 2012. Designed and pitched novel features and filed one patent application.

### **SDL LANGUAGE TECHNOLOGIES, LOS ANGELES, CA – OCT 2004-JULY 2011**

**MANAGER, DEC 2010-JULY 2011**

**SENIOR RESEARCH SCIENTIST, JAN 2010-JULY 2011**

RESEARCH SCIENTIST, JULY 2005-JAN 2010

SENIOR DATA ENGINEER, OCT 2004-JULY 2005

Led the development of the core learning workflows that underpinned SDL's statistical machine translation product line. Provided leadership and vision for six years, transforming the workflow from an academic research project to an internally-facing product. Grew a team of five direct reports and several collaborators with an exciting and engaged group culture and consistently high achievement in an Agile development framework. Successfully implemented a strategy of continuous integration of new research, enabling rapid commercialization in the cutting-edge field of machine translation. Contributed key innovations to enable complete parallelization of every component. Created a novel meta-workflow platform to unify heterogeneous internal processes, increasing operational efficiency, and permitting rapid integration of new capabilities. Built and maintained a close relationship with IT to integrate decision-making concerning workflow software with the management of operating systems and capital investments in new hardware.

Made original contributions to the field of statistical machine translation in the areas of parallel processing, domain adaptation, decoding with synchronous context-free grammars and integrated language models, integration of statistical and rule-based components, and named-entity translation. Co-authored academic conference papers.

Managed and led Professional Services department through an important transition from manual, error-prone processes to repeatable, scalable and automated ones. Formed and maintained an interdepartmental collaboration to gather requirements from Services group and implement them rapidly in the workflow software.

Served as Principal Investigator for several government projects.

**CENTER FOR COMMUNICATIONS RESEARCH, PRINCETON, NJ – JUNE-AUG 2004**

ADJUNCT RESEARCH STAFF

Invited to join the Summer Conference on Applied Mathematical Problems. Performed classified research in cryptology. Successfully combined mathematical research and software engineering in a highly collaborative environment.

**DESIGN SCIENCE, INC., LONG BEACH, CA – JUNE 2001-OCT 2004**

PRODUCT MANAGER

Managed the release of three mathematical expression typesetting products for Macintosh. Team included myself and three other developers. Served as liaison with the Microsoft Office for Mac team.

Collaborated with teammate Robert Miner on math-aware search engine. Modified Lucene open source document indexer with custom analyzer plugin to index normalized MathML expressions. Part of an NSF SBIR project.

## EDUCATION

Carnegie Mellon University, Pittsburgh, PA – M.S. Philosophy, expected 2023.

Columbia University, New York, NY – Ph.D Mathematics, 2001.

Columbia University, New York, NY – B.A., Mathematics and Astrophysics, Magna cum Laude, 1994.

## PUBLICATIONS

*SCFG Decoding without Binarization*, M. Hopkins, G. Langmead, Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP), Cambridge, MA, 2010

*Cube Pruning as Heuristic Search*, M. Hopkins, G. Langmead, Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP), Singapore, 2009

*Extraction programs: a unified approach to translation rule extraction*, Mark Hopkins, Greg Langmead, Tai Vo (2011). Proceedings of the Sixth Workshop on Statistical Machine Translation, 2011.

*A Supersymmetric Quantum Field Theory Formulation of the Donaldson Polynomial Invariants*, G. Langmead, Ph.D. dissertation. Self-published to arxiv.org.

## PATENTS

*Task parallelization in a text-to-text system*, G. Langmead, K. Yamada, K. Knight, D. Marcu, US patent 7,389,222, to Language Weaver, Inc., Patent and Trademark Office, 2008.

*Adapter for allowing both online and offline training of a text to text system*, K. Yamada, K. Knight, G. Langmead, US patent 7,624,020, to Language Weaver, Inc., Patent and Trademark Office, 2009.

*System and method for interacting with a displayed work space*, Donald R. Beaver, Gregory C. Langmead, US patent 9,075,519, to Apple Inc., Patent and Trademark Office, 2015.

*Personalization Aggregate Content Item Recommendations*, Anil A. Sewani, Collin D. Ruffenach, Dominic J. Hughes, Ian J. Elseth, Pushkaraj Bhirud, Sidy Diop, Venkatesh Venkataramanan, Gregory C. Langmead, Gurumurthy D. Ramkumar, US patent pending 16/821,832, to Apple Inc., Patent and Trademark Office.

*Apparatus, system and method for string disambiguation and entity ranking*, Gregory C. Langmead, Dominic J. Hughes, Mark A. Gingrich, Ravi Chandra Jammalamadaka, Donald R. Beaver, Shizhu Liu, Pushkaraj Bhirud, Kamal M. Ali, Daniel Ribeiro Silva, Martin J. Murrett, US patent 10,146,775, to Apple Inc., Patent and Trademark Office, 2018.

*Reader application with a personalized feed and method of providing recommendations while maintaining user privacy*, Martin J. Murrett, Ian J. Elseth, Guillermo Ortiz, Ravi Chandra Jammalamadaka, Dominic J. Hughes, Steve E. Marmon, Casey M. Dougherty, Gregory C. Langmead, Mark A. Gingrich, Donald R. Beaver, Amogh Mahapatra, Collin D. Ruffenach, Georgios Sofianatos, Justin W. Sung, Kang Tu, Jason A. Novak, US patent 10,268,747, to Apple Inc., Patent and Trademark Office, 2019.

## CONTACT

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