

Edmund S.L. Lam

Research Scientist, University of Colorado Boulder

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PROFESSIONAL INTERESTS

My research interests are in designing and developing high-level programming abstractions. From event-based/rule-based concurrency abstractions, Android test scripting & generation, to big-data data-flow programming models. I've worked on the whole deal, designing the syntax and semantics, and crafting them as full-fledged parser-compilers, standard API or combinator libraries, or Restful web-service APIs. I love theory and research as much as I adore diving into engineering challenges: from rapid prototyping of web services, compilers, interpreters, large-scale data processing libraries, to wrangling with the Android runtime, SDK and testing frameworks. Scala, Java, Python and Haskell are the main programming languages I use, while Elixir, Go and C++ are my occasional flings.

EMPLOYMENT

JUL'16-PRESENT **Research Scientist**, *University of Colorado Boulder*
JAN'15-JUN'16 **Senior Researcher**, *Carnegie Mellon University Qatar*
JAN'12-DEC'14 **Postdoctoral Research Associate**, *Carnegie Mellon University Qatar*
JUL'09-DEC'11 **Senior Software Engineer**, *Circos Brand Karma, Singapore*
DEC'08-MAY'09 **Software Engineer**, *CPM Solutions Pte. Ltd., Singapore*
MAY'03-AUG'04 **Software Developer**, *Ser Yong & Associates Pte. Ltd., Singapore*

EDUCATION

MAR'11 **PhD in Computer Science**, *National University of Singapore*
JUN'05 **Bachelor in Computer Science (First Class Honors)**, *National University of Singapore*

ACTIVE PROJECTS

ChimpCheck: Property-based Randomized Test Generation for Interactive Apps

Android testing framework that combines UI scripting (e.g., Robotium, Espresso) with test generation (e.g., randomized exercising) into a single unified executable specification language. Published work on framework and vision [[Onward! '17 \(To appear\)](#)] Languages & Tool-chains used: Scala, Java, Android SDK, Android Espresso & UI Automator, Android ADB, ScalaCheck, Akka, Google ProtoBuf, AWS EC2 & S3

BigGlue: Glue Code Combinator Library for Big Processing Pipelines

High-level combinator library for prototyping and deploying big data processing pipelines across heterogeneous datastores and platforms. Languages & Tool-chains used: Scala, Akka, Akka HTTP and Spray, Apache Kafka, Apache Solr, MongoDB, AWS EC2 & S3

Pipeline for Building and Curating Android App Corpus

Automated pipeline and Rest API for generating and curating Android App build artifacts (JVM binaries and Android APKs). [[Esem'17](#)] Languages & Tool-chains used: Python, Android SDK, Flask, Redis, MongoDB, GrayLog, AWS EC2 & S3, OpenStack

CoMingle: Declarative Programming Framework for Decentralized Mobile Ensembles

Declarative ensemble-centric programming framework for mobile devices. Published work on the framework and semantics [[Coordination'15](#)], time-synchronized orchestration [[WiMob'15](#)] and choreographic transform [[RuleML'16](#)]. Languages & Tool-chains used: Python, Java, Android SDK

PAST PROJECTS & PROFESSIONAL ENGINEERING ACTIVITIES

Multiset Rewriting for Decentralized Ensembles

Concurrency abstraction based on decentralized multiset rewriting. Provides ensemble-centric specifications of distributed computations and utilizes choreographic compilation to obtain node-centric executable code. Published work on assertion/retraction [PPDP'12], choreographic transform [PPDP'13], multiset comprehension patterns [CHR'14], reasoning about sets in Z3 [SMT'14], compilation [APLAS'14] and modularity [LPAR'15]. Languages & Tool-chains used: Python, Java, C++, Haskell

Web Analytics Back-end Services, *Circos Brand Karma, Singapore* (JUL'10-DEC'11)

Led the design, development and deployment of the high-performance data processing web systems that powered the company's web-analytic services. Languages & Tool-chains used: *Python, C++, Haskell, PostgreSQL, Redis, Perlbal, Amazon Web Services EC2 & S3.*

Web Analytics Front-end, *Circos Brand Karma, Singapore* (JUL'09-JUL'10)

Participated in the development, deployment and day-to-day operations of the company's flagship web-analytic website for the hospitality industry. Languages & Tool-chains used: *Python, Javascript, Django, PostgreSQL, Amazon Web Services EC2.*

TEACHING EXPERIENCE

15-317 Constructive Logic (Fall 2015), *Carnegie Mellon University Qatar*

CS1101 Programming Methodology (May'04-Jan'05), *National University of Singapore*

SELECTED PUBLICATIONS

FULL LIST: [[PERSONAL WEBSITE](#)] [[DBLP](#)]

- [Onward!'17] Edmund S.L. Lam and Peilun Zhang and Bor-Yuh Evan Chang. Property-based Randomized Test Generation for Interactive Apps. In *proceedings of ACM International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software, Onward! 2017*.
- [RuleML'16] Iliano Cervesato and Edmund S.L. Lam and Ali Elgazar. Choreographic Compilation of Decentralized Comprehension Patterns. In *proceedings of Research, Tools, and Applications 10th International Symposium, RuleML 2016 (Best Paper Award)*.
- [LPAR'15] Iliano Cervesato and Edmund S.L. Lam. Modular Multiset Rewriting. In *proceedings of 20th International Conference on Logic for Programming, Artificial Intelligence and Reasoning 2015*.
- [WiMob'15] Edmund S.L. Lam, Iliano Cervesato and Ali Elgazar. Programmable Orchestration of Time-Synchronized Events Across Decentralized Android Ensembles. In *proceedings of 11th IEEE International Conference on Wireless and Mobile Computing 2015*.
- [Coord'15] Edmund S.L. Lam, Iliano Cervesato and Nabeeha Fatima. CoMingle: Distributed Logic Programming for Decentralized Mobile Ensembles. In *proceedings of the 17th International Conference on Coordination Models and Languages 2015*. Volume 9037 of the series Lecture Notes in Computer Science pp 51-66, Springer.
- [APLAS'14] Edmund S.L. Lam and Iliano Cervesato. Optimized Compilation of Multiset Rewriting with Comprehensions. In *proceedings of the 12th Asian Symposium on Programming Language and Systems 2014*. Volume 8858 of the series Lecture Notes in Computer Science pp 19-38, Springer.

GRANTS & AWARDS

- NOV'16 **Amazon Web Services (AWS) Cloud Credits for Research**, Recipient of 25,000 AWS Credits
- AUG'16 **RuleML'2016 Best Paper Award**, awarded to "Choreographic Compilation of Decentralized Comprehension Patterns"
- DEC'13 **QNRJ JSREP 4-003-2-001**, *Effective Distributed Programming via Join Patterns with Guards and Propagation*, USD\$300,000, Lead Principle Investigator
- JUN'05 **PhD Research Scholarship**, *National University of Singapore*
- JUN'05 **First Class Honors**, *National University of Singapore*
- OCT'04 **SFCI Technofairs Scholarship 2004/2005**, *National University of Singapore*

PERSONAL INFO

- LANGUAGES English (Professional & Primary Language), Mandarin (Basic)
- WEB-SITES Personal Page - <https://edmund-sllam.com>
LinkedIn Page - <https://www.linkedin.com/in/sllam/>
ResearchGate - https://www.researchgate.net/profile/Edmund_S.L.Lam

REFERENCES

- Prof. Iliano Cervesato Email: iliano@cmu.edu
Direct supervisor at Carnegie Mellon University in Qatar (2012-16)
- Prof. Martin Sulzmann Email: Martin.Sulzmann@hs-karlsruhe.de
PhD advisor at National University of Singapore (2005-11)
- Dr. Kenny Zhuo Ming Lu Email: kenny_lu@nyp.edu.sg
Direct supervisor at Circos Brand Karma (2009-11)
- Augustine Low Email: augustine@robertparker.com
Direct supervisor at CPM Solutions Pte. Ltd. (2008-09)