Emily Pillmore

Personal Data

Date of Birth:	California, USA | 28 Feb 1990
Current Location:	Asheville, NC
Phone:	+1 435 901 5907
email:	emilypi@cohomolo.gy
twitter:	pitopos
Github:	github.com/emilypi, github.com/cohomolo-gy
Hackage:	topos

Work Experience

Current / July 2018 — Senior Software Engineer/Advisor at **Kadena**, Brooklyn, NY

Distributed Systems, Formal Verification, Language Design

Lead maintainer of the Pact smart contract language, a Lisp variant with Hindley-Milner type inference and a formal verification suite built on Z3, written in Haskell. Lead engineer on a novel Proof-of-Work blockchain (Chainweb), a permissioned Byzantine Fault-Tolerant blockchain (Kuro), and a smart HD-key wallet written in Reflex (a Haskell FRP library). Recently moved to an advisor position with the company to provide ongoing research direction and maintenance advice.

Tech: *Haskell, AWS S3 + EC2, Kibana, ElasticSearch, Amberdata, Haskell, Sqlite3, PostgresQL, Docker Compose*

2017-2018 — Senior Software Engineer at **Cake Solutions**, NYC

Distributed Systems at Scale

Streaming architecture and distributed systems for Disney Streaming (a Cake Solutions client), working on the ESPN livestream and VOD architecture. This role was primarily functional programming in Scala, serving millions of concurrent users daily. Focus was on the Media Servces/Media Targeting/Media Security (mdrm) protocols.

Tech: *Scala, AWS S3 + EC2 + KMS, DynamoDB, Kibana, ElasticSearch, Gatling, Cats, Protobuf, Akka, Akka-http, Netty, http4s, Apache Spark, Docker Compose, Vagrant*

2015-2017 — Consultant/Expert Advisor at **Platinion North America**, NYC

Data analysis, CCAR audit, audit consulting, model validation, reverse model engineering, technical documentation, statistical analysis

Consultant for Platinion North America (a BCG company), focusing on model validation, reverse model engineering in C++, technical drafting, and data audit for CCAR projects on Wall St.

Tech: *C++, SAS, Python, R*

2015-2015 — Operations Analyst at **Goldman Sachs**, Salt Lake City

FX confirmations group

Education

May 2014 — Bachelor of Science in Mathematics, **University of Utah**, Salt Lake City

Emphasis on Topology and Geometry | Major: Mathematics

Achievements include: TA for Introduction to Algebraic Topology II (MA5520) ,
participant in student lecture series giving talks on the following:

- The Word distance, Hyperbolic Groups, and the Milnor-Svarc lemma
- Simplicial, Singular, and Cellular Homology
- The Baire Category Theorems
- Geometric Group Theory

Publications

January 2020	*Profunctor Optics: a categorical update* (arxiv/2001.07488)
February 2020	*Profunctor Optics: The Categorical View* (n-category cafe)

Certifications

- Lightbend Apache Spark for Scala - (Instructor)
- Lightbend Scala Language - Expert (Instructor)
- Lightbend Scala Language - Professional (Instructor)
- Lightbend Akka for Scala - Expert (Instructor)
- Lightbend Akka for Scala - Professional (Instructor)

Patents

November 2018	KA02-004-UT-01US-PRO1 - Formally verified smart contracts (co-author)

Volunteering + Extracurriculars

December 2020-Present	Haskell Foundation Working Group chair
August 2020-Present	Skillsmatter Program Committee member
February 2020-Present	Haskell Core Libraries Committee member
February 2019 - January 2020	Adjoint School, Applied Category Theory (ACT)
January 2019-Present	Lambda Conf committee member
January 2019-Present	Haskell.org committee member
April 2018-Present	Board-member of Functional Conf, Bengaluru

Talks

September 2020 — **Haskell Love**

Hulk Smash

45-min talk introducing a new geometro-topological viewpoint to the Haskell lexicon, showing how to make use of some relatively simple datatypes to draw a direct analogy with dicrete forms of the Wedge Sum, Pointed Product, and Smash product of algebraic topology. Talk

September 2019 — **Scala World**

Type Arithmetic and the Yoneda Lemma

90-min talk building a notion of arithmetic in Cartesian Closed Categories with special emphasis on the philosophical perspective of reasoning via the Yoneda Lemma and Leibniz Principles. Talk

June 2019 — **LambdaConf**

Isomorphic Reasoning

A 6-hour workshop building the foundational knowledge to understand "type arithmetic" in Cartesian Closed Categories, with special emphasis on proofs via the Yoneda lemma. Talk

June 2019 — **LambdaConf**

Adjunctions and Free Constructions

A 90-min talk teaching the fundamentals of adjunctions and free constructions in Category Theory. Talk

January 2019 — **SBC**

Formally Verified Smart Interfaces

A 5-minute lightning talk at Stanford Blockchain Conference detailing recent innovations I'd made in formally verifying smart contract interfaces (think Haskell typeclasses with laws!). Video

Meetups

Leader:	NY Homotopy Type Theory (HoTT) meetup
Co-organizer:	NY Haskell User Group, NY Category Theory Meetup
Participant:	CUNY Graduate Category Theory Seminar

Languages

English:	Primary
Spanish:	Conversant
French:	Basic Knowledge

Academic Interests

My current academic focus is building towards understanding Homotopy Theory, Algebraic Topology, and Category Theory. Currently, I am partnered with Igor Popov, working on category-theoretic models for System F, GADTs, and parametricity.

Other Interests and Activities

Trail Hiking, Music (I am a fairly competent Latin Jazz guitarist), hobbyist electronics engineer (building guitar amplifiers and electronics components for guitar).