Ymir Vigfusson

Icelandic hacker and a computer security expert

Ymir Vigfusson is an Assistant Professor in the Department of Mathematics and Computer Science at Emory University since 2014, and Adjunct Assistant Professor at School of Computer Science at Reykjavik University in Iceland since 2011. He is a co-PI of the Symbiosis lab at Emory University.

Ymir's biography

Ymir Vigfusson's background
His research spans distributed systems and data science, and is motivated by three beliefs:

- That networked systems should just scale effortlessly
- That the best practical way to improve security is for people to really understand how things break,
- That clever use of technology can improve disease outbreak surveillance (think epidemics)

Ymir Vigfusson's research is supported by an NSF CAREER award, contracts from the CDC, RANNIS grants and other funding from industry.
He is also a co-founder and Chief Science Officer of Syndis, a growing multinational company focused on research and services in offensive information security.
He have had the fortune of learning from some remarkable people, and enjoy passing on what he know to his students.

Ymir's talks

- **Why I teach people how to hack?**
  Here I discuss my philosophy for why I focus on teaching hacking instead of traditional security. In short, I think that defense is best served if you adopt the hacker mind-set, the understanding about what can wrong and how it can be exploited. I adapt this approach in university courses, hacking competitions, and a security company I founded called Syndis. The approach is effective and engaging for students, but also raises important ethical questions.

- **Why It's a small world**
  On Facebook, you know pretty much any person on the planet through a friend of a friend of a friend of a friend. In more traditional settings, the distance is about 6. Why is this case? In this Pearls of Computation talk given at Reykjavik University in 2014, I discuss some of underlying reasons and the models that scientists have come up with the explain our ‘small-world’.

- **Better Analysis for estimating malaria prevalence**
  If you are unlucky enough to have malaria, you might even have multiple strains of malaria concurrently from different mosquito bites. These multiple infections confound our malaria surveillance and make it harder to monitor how well different intervention strategies are working.

- **Ultra Scalable Messaging Systems**
  My PhD work included two systems that deal with scalability of data replication and messaging: Dr. Multicast and Kevlar. The former addresses scalability challenges of IP Multicast within data centers, arguing that the technology can be safely used. Kevlar is about enabling efficient messaging in wide-area networks, seamlessly bridging together different messaging systems.

- **Elastic storage via file motifs**
  I gave this research talk at the USENIX HotStorage 2014 workshop, presenting an elastic storage system we have been working on. In short, cloud systems make it easy to elastically dial up CPU and memory resources for virtual machines, but it’s hard to scale back storage since we’re committed to not losing data. Harmonium allows you dynamically scale back storage resources by exposing a ‘motif’ abstraction: a recipe for how files were created and how they could be recreated. Harmonium transparently removes old files, allowing them to be seamlessly recreated later when they are needed.

- **How Alan Turing cracked the enigma**
  This general-audience lecture explais the details of the elusive and fearsome Enigma cryptographic machine that Germans used to encrypt message in WW2, and how the Allies systematically exploited the system. The talk gives an insight into some of the major contributions by Marian Rejewski and Alan Turing, and attempts to explain the ingenuity of their insights.