Paweł Foremski, PhD Eng.

Location	Gliwice, Poland
Contact	pjf@foremski.pl
Web presences	Google Scholar / GitHub / Twitter / LinkedIn

Education

2014 – 2019	PhD (Eng) in Computer Science (cum laude) Silesian University of Technology *"Internet Traffic Identification Using Cascade Classification" (thesis)*
2005 – 2011	Master of Science (Eng) in Computer Science Silesian University of Technology *Interdisciplinary Studies: Automatic Control And Robotics, Electronics And Telecommunications, Computer Science (in English, see the thesis)*

Work Experience

Since 2019- *Gliwice, Poland*	Assistant Professor, Polish Academy of Sciences (IITiS PAN) • *Research on BGP security: Kirin, BGPFix library* • *Run own BGP research testbed (AS39282)* • *Investigator in an EU Horizon 2020 grant on IoT security*
Feb 2022 – Sep 2023 *San Francisco, CA, USA*	Staff Software Engineer, Senior Research Engineer, Kentik • *Designed and built a new DDoS mitigation platform – deploy custom BGP Flowspec rules based on IP flow patterns* • *Built a BGP gRPC proxy agent*
2016 – 2022 *San Mateo, CA, USA*	Scientist, Senior Distributed Systems Eng, Farsight Security • *Designed, built, and popularized a big-data, real-time telemetry data processing platform: DNS Observatory* • *Research, design, and implementation of on a new large-scale BGP streaming data platform (BGPDB)* • *Golang and C software developer for the largest passive DNS data provider (improving DNSDB)* • *Research on DNS hijacking and censorship (IETF 99)*
2015 – 2016 *Cambridge, MA, USA*	PhD Intern, Research Contractor, Akamai Technologies • *Proved IPv6 is scannable (patented by Akamai)* • *Survey of the World-Wide Web using DNS databases and active measurements: Virtual Hosting, HTTP/2, TLS, IPv6*
2011 – 2019 *Gliwice, Poland*	Research Assistant, Polish Academy of Sciences (IITiS PAN) • *Principal Investigator in own grant on IP Traffic Classification* • *Investigator in grants on 4G LTE and WiFi networks*
2004 – 2010 *Silesia, Poland*	Co-Founder and CTO, ASN Sp. z o.o. • *Leader of the software engineering team* • *Designed and implemented several embedded Linux systems for wireless communication products* • *Created and managed an ISP for a few cities (AS43929)*

Select Skills

Software Development

- Current: expert in Linux development in Golang (8y)
- Past strong experience in: C, Bash, Python, JavaScript (web), Java (Android)
- Basic experience: Perl, C++, C#, x86 assembler, BPF, Linux kernel programming (device drivers)
- Web applications: jQuery, HTML, CSS, SVG
- Android development (SDK and NDK)
- Relational databases: sqlite, MySQL, Postgres

Computer Networks

- Deep understanding on the organization of the Internet: autonomous systems, IXPs, DNS, IPv6, BGP, TLS, etc.
- Delivering Internet access: PPPoE, RADIUS, IEEE 802.11, monitoring network reliability
- E-mail protocols: SMTP, POP3, IMAP, SPF
- Routing protocols: BGP, OSPF, OLSR
- Linux administration: traffic filtering and classification, application servers, virtualization (KVM)

Internet Research

- Contributed to the world's state-of-the-art in IP traffic classification, security of IPv6, DNS, and BGP
- Large-scale Internet measurements: DNS databases, active scans, IP traffic monitoring (libpcap, flowcalc)
- Data analysis and visualization: ipython, numpy, scipy, Matplotlib, Gnuplot, Matlab / Octave, rrdtool
- Machine Learning: Weka, scikit-learn, ensemble classifiers
- Working knowledge in artificial intelligence, statistics, probabilistic graphical models, information theory, etc.

Writing Skills

- Papers published in peer-reviewed, international journals
- Familiarity with Doxygen (code documentation), DocBook (user manuals), LaTeX (scientific writings), etc.

Select Works

Conferences

- IETF115 (Nov 2022, London): *KIRIN: attacking BGP with IPv6*
- ACM IMC 2019 (Amsterdam): *DNS Observatory: The Big Picture of the DNS*
- RIPE74 (May 2017, Budapest): *Entropy/IP: Uncovering Structure in IPv6 Addresses* (video, slides)

Papers

- Gasser O., Scheitle Q., Foremski P., Lone Q., Korczyński M., Strowes SD, Hendriks L., Carle G., *"Clusters in the expanse: Understanding and unbiasing IPv6 hitlists"*, ACM IMC 2018
- Foremski P., Vixie P., "*The modality of mortality in domain names*", Virus Bulletin 2018
- Foremski P., Plonka D., Berger A., *"Entropy/IP: Uncovering Structure in IPv6 Addresses"*, ACM IMC 2016

US Patents

- Main inventor for US20210194775A1
  Internet address structure analysis, and applications thereof
  Assignee: Akamai Technologies, Inc. (March 2021)

Open Source Software

- BGPFix: a Golang library for fixing BGP sessions in-flight
- dingo: one of the first DoH clients (see Ars Technica post)
- tracedump: why eBPF in the Linux kernel was truly needed

Last update: 23-08-2023