



**Welcome!**



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# Thank You to Our Fearless General



**Nate Foster**

Professor, Cornell University



# Thank You to the Amazing Support From



**Denise Barton**  
Linux Foundation



**Michelle Roth**  
Linux Foundation



# Thank You to Our Steadfast PC

- **Jehandad Khan**, AMD
- **Ori Rottenstreich**, Technion
- **Vishal Shrivastav**, Purdue
- **Gianni Antichi**, Politecnico di Milano and Queen Mary University of London
- **Ben Pfaff**, Feldera
- **Ajay Thakur**, Intel Corp
- **Victor Liu**, University of Michigan
- **Vladimir Gurevich**, P4ica
- **Tushar Swamy**, Unaffiliated
- **Yiming Qiu**, University of Michigan
- **Amedeo Sapio**, AWS
- **Lavanya Jose**, Google





**Reminder:**  
**Check out Demos and**  
**Posters during Breaks**  
**and Lunch!**

# New Working Group Chairs

- **Language Design WG**

- Jonathan DiLorenzo, Google, June 2023
- Ryan Goodfellow, Oxide, June 2024

- **API WG**

- Chris Sommers, Keysight, May 2023

- **Education WG**

- Muhammad Shahbaz, Purdue, July 2023

- <https://p4.org/working-groups>



# Language Design WG



- **Imminent release of v1.2.5 of language specification.**
- **Not in 1.2.5, but focus areas of work for months now:**
  - **Loops** in p4c front end since May 2024
    - Thank you, Chris Dodd!
    - Target device can choose to support only loops that can be unrolled at compile time.
  - **Formal specification of P4 semantics** - Nate Foster
  - **Underlying ISA for P4** - Ryan Goodfellow
  - **Improving abstractions** - Jonathan DiLorenzo
    - This might become a Rust-inspired compile-time macro system with conditionals and loops.



# API WG



- **Imminent release of v1.4.1 of P4Runtime specification.**
- **New additions in the past year:**
  - P4Info file generated by p4c includes table's initial default action, even if not const
  - 1-rate 2-color meters, useful for targets where those are cheaper in HW resources.
  - Resource limits on multicast groups.
  - Support initial entries for tables in P4 source code, modifiable at runtime.
  - Add Rust to the existing Golang and Python pre-generated files for Protobuf messages.

# Architecture WG



- **Progress on Portable NIC Architecture has not been quick the past year.**
- **But work by programmable NIC vendors has proceeded rapidly.**
- **We expect to see renewed interest soon for publishing more work here.**

# Retreat on Programmable

## Forwarding

- **What: 1.5 days of talks and break-out sessions on future areas of interest.**
  - AI/ML networking, programmable NICs and switches, Linux kernel networking, Formal modeling
- **Who: 20 technical leaders invited from government, industry, and academia.**
- **Why: Discuss broad trends in programmable forwarding, and identify a future road map for the P4 language.**
- **Thanks to Nate Foster for organizing!**



# A few key takeaways



- **Work in AI/ML**

- Generating many ideas in transport protocols, congestion control, load balancing, and telemetry.
- We expect this to favor NICs and switches with programmability in these areas.

- **Using P4 as a precise specification language**

- Google has seen excellent results in this area.
- A ripe area for network vendors and their customers to use for communicating product requirements/features.

- **Several noteworthy announcements to come!**

- Join p4-announce and P4 Zulip community.

# 2024 Google Summer of Code



- **Contributors**

- Adarsh Rawat: P4 Compiler Documentation
- Nitish Kumar: P4 Formatter
- Rupesh Chiluka: BMv2 PNA Support
- Stanislav Kosorin: P4-Enabled Container Migration in Kubernetes

- **Mentors**

- Bili Dong, Davide Scano, Fabian Ruffy, Hari Thantry, Radostin Stoyanov

- <https://github.com/p4lang/gsoc>



# P4 Project Ideas repository



- <https://github.com/p4lang/project-ideas>
- **Join in if you are looking for ...**
  - Advertising “projects”, including bug fixes and enhancements to existing [github.com/p4lang](https://github.com/p4lang) projects.
  - A list of ideas for things you might want to work on.



**2024**

**Distinguished**

**Contributor**

**Award**