Beginner Track Agenda (morning session)

- **8:00 - 8:30am**
  - *Registration and Breakfast*

- **8:30 - 9:00am**
  - Technical Set-up for Hands-on Lab
  - In order to complete the Developer Day exercises, we will distribute a virtual machine with all required software installed.

- **9:00 - 9:10am**
  - Welcome and Introductions
    - Speaker: Nate Foster (Cornell University)

- **9:10 - 10:30am (80 min)**
  - Tutorial overview: Introduction to Data Plane Programming
  - Session 1: Language Basics
    - This session will provide a hand-on introduction to P4. Students will start by implementing a “Hello World”-style application to gain an understanding of P4 concepts. The lesson will progressively introduce core language features, such as header/metadata types, packet parsers, and controls. By the end of this session, students will be able to implement a basic IP router.

- **10:30 - 11:00am**
  - *Break*

- **11:00 - 12:30 (90 min)**
  - Session 2: P4 Runtime
    - In this session students will learn about software tools that are essential to developing P4 applications. Instructors will show how to invoke the the P4 compiler, run the debugger, and start a P4 software switch. This session will also introduce the control-plane interfaces via P4 Runtime, a protocol-independent API auto-generated from the definition of a packet processing pipeline written in P4.

- **12:30 - 1:30pm**
  - *Lunch*

Agenda continued below

Beginner Track Agenda (afternoon session)

- **1:30 - 1:50pm**
  - P4 Showcase:
    - Speaker: Dejan Vucinic, Western Digital Corporation

- **1:50 - 2:10pm**
  - P4 Showcase:
    - Speaker: Ludovic Beliveau, Kaloom

- **2:10-3:10 (60 min)**
  - Session 3: Monitoring and Debugging
    - This session will focus on a set of labs related to network monitoring and debugging. In this session, students will gain a deeper understanding of P4 language concepts, including custom headers and intrinsic metadata. In the first exercise, students will implement Explicit Congestion Notification (ECN) to set a congestion bit in a packet header when the queue depth exceeds a threshold. In the second exercise, MRI, students will implement a simplified version of In-Band Network Telemetry to track the path that packets travel through the network.

- **3:10 - 3:40pm**
  - *Break*

- **3:40 - 4:40pm (60 min)**
  - Session Advanced Data Structures
    - In the final session, we will cover advanced data structures. Students will implement two data-plane applications. In the first, source routing, end-hosts specify paths through the network by using a stack of labels in the packet header. The switch must “pop” each label and forward out the appropriate interface. In the second, students will implement a network calculator. Packets containing arithmetic expressions are sent to a switch. The switch will evaluate the expressions, and return the results back to the sender.

- **4:40 - 5:00pm**
  - P4 Showcase: "Leveraging P4 for Automated Switch Validation"
    - Speaker: Konstantin Weitz, Google

- **5:00 - 5:20pm**
  - P4 Showcase:
    - Speaker: Arkdadiy Shapiro, Barefoot Networks

- **5:20-5:30pm**
  - Closing Remarks

- **5:30-6:30**
  - *Reception*