# *Distributed and Operating Systems*
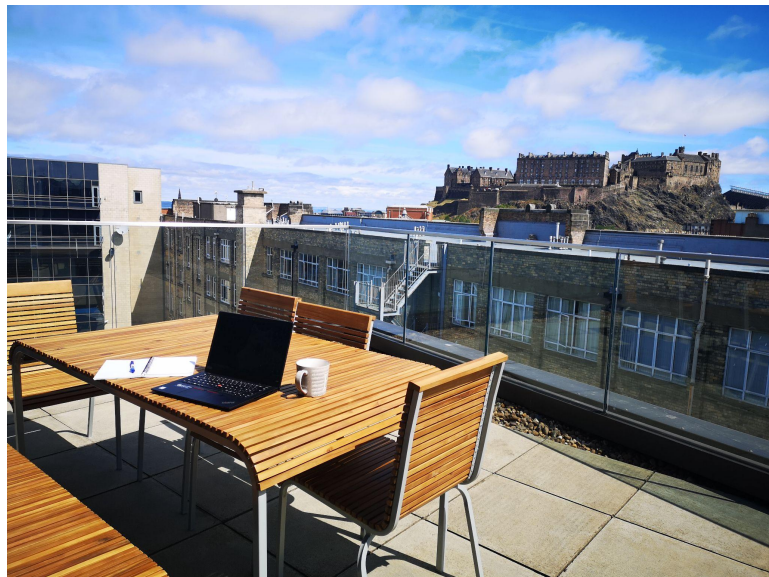
## *Huawei Global Software Technology Summit 2023*

Adam Barker

Director of SIR, Huawei Edinburgh Research Centre

# Edinburgh Research Centre (ERC)

- Established in October 2018
  - 51 full-time employees
  - 43 interns and contractors

- 5 research groups
  - Knowledge Graph Lab, led by Jeff Pan
  - Databases Lab, led by Nikolaos Ntarmos
  - Programming Languages Lab, led by Dan Ghica
  - Indoor Positioning Lab, led by Firas Alsehly
  - Systems Infrastructure Research, led by Adam Barker

# Systems Research at Huawei

- Systems Infrastructure Research (SIR) is a newly formed research group that brings **forward-looking systems research** into Huawei's infrastructure

- Rapidly explore, design, prototype and evaluate the next generation of data centre technologies for the benefit of:
  - Internal core services; cloud products; wider industry (e.g., open-source)
- **Intersection of machine learning and systems**
    i. Machine learning for systems, e.g., workload prediction
    ii. Systems for machine learning, e.g., GPU sharing
    iii. Reflected in our hiring
  - Propose research solutions for Huawei production infrastructure
  - Long-term innovation to support the next generation systems infrastructure

# Session Overview and Themes

- Real-time systems

- Serverless architectures

- Operating systems

- High performance computing

- Machine learning for systems

- Systems for machine learning

# Schedule

| TIME | TOPIC | | SPEAKER |
|------|-------|---|---------|
| 09:00-09:10 | Summit Opening Speech <br> > View Details | | Adam Barker |
| 09:10-09:20 | White Paper Reveal <br> > View Details | | David Robertson |
| 09:20-10:00 | Digital Evil Twin - identification of worst-case behaviours in real-time systems <br> > View Details | | Leandro Soares Indrusiak |
| 10:00-10:40 | Enabling Serverless Research with the vHive Open-Source Ecosystem <br> > View Details | | Prof. Boris Grot |

🍴 COFFEE BREAK (20 MINUTES)

# Schedule

| | | |
|---|---|---|
| 11:00-11:40 | Rethinking Systems Software for Emerging Data Center Hardware <br> ❯ View Details | Antonio Barbalace |
| 11:40-12:20 | Rethinking service isolation to reduce the cloud tax <br> ❯ View Details | Lluis Vilanova |

🍴 **LUNCH BREAK (1 HOUR)**

| | | |
|---|---|---|
| 13:20-14:00 | Predicting the performance of systems through Deep Learning <br> ❯ View Details | Stephen McGough |
| 14:00-14:40 | Automatic Parallelization for large AI models <br> ❯ View Details | Denis Barthou |

🍴 **COFFEE BREAK (20 MINUTES)**

# Schedule

**⋔ COFFEE BREAK (20 MINUTES)**

| | | |
|---|---|---|
| 15:00-15:40 | The Long and Winding Road Towards Efficient High-Performance Computing<br>› View Details | William Jalby |
| 15:40-16:20 | Challenges for Extreme Scale Computational Science and Machine Learning<br>› View Details | Serge Petiton |