

Bootstrapping a Systems and Networking reading group

Organizers:

- Jethro Shuwen Sun (jethrosun@ccs.neu.edu)
- Connor Zanin (zanin@ccs.neu.edu)

Updated: [Reading Group Covered Topics](#)

Note: *Topics covered here are not finalized and we are currently calling for participants. If you are interested in this and can commit (some of) your time to help us form the group, please shoot us an email!*

P.S. *If you have time, please also include a one sentence description so that we know your particular interest (e.g., you are interested in systems research or that you want to understand some recent systems trends).*

Topics:

- Machine learning (meshed learning): learning based solution for systems problems
 - “ML for Sys and Sys for ML”, talk by Jeff Dean at [NIPS’17](#) and [SysML’18](#)
 - Also see Tim Kraska from MIT ([link](#))
- Programmable networks: SDN, NFV, P4
 - P. Bosshart et al., [Forwarding Metamorphosis: Fast Programmable Match-Action Processing in Hardware for SDN](#), SIGCOMM 2013.
 - CMU 15-829 Programmable Networks by Justine Sherry ([link](#))
- Theory & Systems:
 - [Approximating Fair Queueing on Reconfigurable Switches](#), NSDI’18
 - [Evaluating the Power of Flexible Packet Processing for Network Resource Allocation](#), NSDI’17
 - [Why is random testing effective for partition tolerance bugs?](#), POPL’18
- Formal methods & Systems:
 - The Good, the Bad, and the Differences: Better Network Diagnostics with Differential Provenance, SIGCOMM’16 ([link](#))
 - Secure Network Provenance project: [link](#)
 - [Verification in the Age of Microservices](#). Aurojit Panda et al, HotOS’17
- Programming language & Systems:
 - CS 7680 [Programming Models for Distributed Computing](#), (NU Fall 2016)

- CMPS290S , [Languages and Abstractions for Distributed Programming](#), (UCSC Fall 2018)
- Noria: dynamic, partially-stateful data-flow for high-performance web applications, OSDI'18 [link](#)
- [System Programming in Rust: Beyond Safety](#). Aurojit Panda et al, HotOS'17
- Hardware offloading & Systems:
 - [Azure Accelerated Networking: SmartNICs in the Public Cloud](#) NSDI'18
 - [VFP: A Virtual Switch Platform for Host SDN in the Public Cloud](#), NSDI'17
- Cloud: FaaS (Lambdas), containers, unikernel
 - [BU CS528 / BU EC528 /NU CS 6620](#)
- Networking in real and production: datacenter networking, IXP
 - S. Jain et al., [B4: Experience with a Globally-Deployed Software Defined WAN](#), SIGCOMM 2013.
 - [Inside the Social Network's \(Datacenter\) Network](#), Arjun Roy et al, SIGCOMM'15
 - [Taking the Edge off with Espresso: Scale, Reliability and Programmability for Global Internet Peering](#), SIGCOMM'17
- **Q:** What's missing in today's systems research? **A:** Measurement, security, diagnosis?
 - SIGCOMM'17 best of CCR: [Principles for measurability in Protocol Design](#)
- Fault Tolerance
 - [Practical Byzantine Fault Tolerance](#)
- IoT Systems & Networks
 - IoT network intrusion detection:
<https://arxiv.org/ftp/arxiv/papers/1704/1704.02286.pdf>
 - Capability-based access control:
http://vbn.aau.dk/files/74574200/PNM_IACAC_River.pdf

Current Issues:

1. Not enough attention to NetSys area and/or to accelerate research for PhD, *i.e.* no advanced systems and networking PhD courses
2. Also not enough attention to recent research in NetSys area in important venues, *i.e.* NSDI, OSDI, SOSP, SIGCOMM

Goal:

The goal is to bootstrap a reading group with a particular focus on important and interesting trends/things in systems research, which hopefully will accelerate research for individual participants. Thus, the topics discussed should have a broader impact on the field and can draw students/faculty members' attention.

Proposed Approach:

1. Form a reading group with a focus on the proposed topics, currently no such reading group or seminar like courses exist
2. Some of the topics are broader than the NetSys, the reading group should be able to involve other faculty members or PhD students in other fields, e.g. PL, theory, formal method