

Programming reading group

2023/2024

So, it is also time to resume our reading group! I will create a real web page for the group during the semester, but we start low-tech. **Please add your email below if you are interested in meeting announcements.**

Upcoming meetings

We are meeting on Mondays (somewhat irregularly) at 10:40. Tomas will send an announcement with paper details to everyone listed below in advance.

24 June 2024 (10:40, S10, MFF, Malostranske nam. 25) - Ondřej Kubánek

- Staged Compilation with Two-Level Type Theory: <https://andraskovacs.github.io/pdfs/2ltt.pdf>
- Ondrej will be visiting us from Chalmers where he is doing Masters and so we can make another attempt to make sense of work based on type theory! This paper uses it to solve an interesting practical problem of staged computation - the paper gets fairly technical, but let's try to read Section 1 and 2 before the meeting.
- There is also a demo in Haskell: <https://github.com/AndrasKovacs/staged>
- You may also find it useful to check out the abstract and introduction of a follow-up paper that appeared just now (Ondřej may say a few things about this too): <https://github.com/AndrasKovacs/staged/blob/main/icfp24paper/README.md>

6 June 2024 (11:00, A-1435, FIT Dejvice) - Aleksander Boruch-Gruszecki

- Formal Foundations of Capture Tracking
- Talk based on his PhD thesis: <https://infoscience.epfl.ch/record/309351?ln=en&v=pdf>

27 May 2024 (10:40, S10, MFF, Malostranske nam. 25) - Tomas Petricek


- Live Objects All The Way Down: Removing the Barriers between Applications and Virtual Machines: <https://programming-journal.org/2024/8/5/>
- This is a system overview and seems fairly readable - key ideas seem to appear in Section 4, so please read enough of the paper to be ready to discuss what is there.

Related talk invitation! Thursday 23 May (15:00, over Zoom)

- Title: Lua and register-based VM
- Speaker: Hugo Musso Gualandi currently at PUC-Rio.
- Joining link: <https://northeastern.zoom.us/j/93252219058>

13 May 2024 (11:00, T9:364b, FIT Dejvice) - Jan Liam Verter

- SASyLF part 2 - in the previous meeting, we looked at exercise 1. In this meeting, we will finish SASyLF introduction by looking at the proofs about lambda calculus in exercise 2.

- If those proofs are new to you, you may find it useful to have a look at the “Safety = Progress + Preservation” section of the “Types and Programming Languages” book
- For our internal purposes, here is a PDF of the book:  [types-and-pl.pdf](#)

29 April 2024 (11:00, T9:364b, FIT Dejvice) - Jan Liam Verter

- **Hands on!** This time, we will look at the SASyLF proof assistant. The objective is to actually try proving some proofs using the assistant!
- **Installation:** Install SASyLF from: <https://www.cs.cmu.edu/~aldrich/SASyLF/>
- **Instructions:** Before the meeting, please install SASyLF and try to complete the exercise1.slf from: <https://github.com/boyland/sasylf/tree/master/exercises> We will then look at the solution in the meeting, as well as have a look at exercise2.slf.
- **Location:** We are meeting at FIT this time! You can find a floorplan here: <https://help.fit.cvut.cz/rooms/conference-rooms/index.html>

Related talk invitation! Tuesday 16 April (14:30 in T9-302 at FIT, as part of NI-RUN course)

- [V8] From <script> to native code: how to compile the web --- A quick tour of Chrome's JS engine, its compilers and unique trade-offs
- Speaker: Olivier Flückiger, Google V8

15 April 2024 (10:40, MFF Malostranské nám., S510) - Tomas Petricek

- **Paper:** “A core calculus for documents” - <https://arxiv.org/pdf/2310.04368.pdf>
- **Instructions:** Ideally, look at sections 1, 2 and (most of) 3. It may be interesting to discuss the theorems in section 5 (but not their proofs).
- **Location:** We are meeting at MFF this time! The room is on 5th floor: <https://cs.mff.cuni.cz/cs/prakticke-informace/plan-budovy>

11 March 2024 (11:00, T9:364b, FIT Dejvice) - Filip Krikava

- Producing wrong data without doing anything obviously wrong! <https://dl.acm.org/doi/10.1145/1508284.1508275> or use a non-paywall link: <https://users.cs.northwestern.edu/~robby/courses/322-2013-spring/mytkowicz-wrong-data.pdf>
- This is an accessible systems paper - and it should be easy to read (no typing rules this time!) - it would be great if we were all familiar with sections 1 to 4.
- Note we are meeting at FIT this time! You can find a floorplan here: <https://help.fit.cvut.cz/rooms/conference-rooms/index.html>


Ideas for future meetings

Please add your ideas for future meetings below.

- Refinement types - Tomas Petricek (still looking for the most accessible overview paper...)
- Incorrectness logic - Jan Vitek
- Verification as constraint horn clause solving - Martin Blicha (sometime after mid-January) – DONE!

Past meetings

5 February 2024 (10:40, MFF Malostranské nám. S10) - Martin Blichá

- Constraint-Based Contract Inference for Deductive Verification
https://link.springer.com/chapter/10.1007/978-3-030-64354-6_6
(local copy in case you cannot access the above  alshnakat.pdf)
- A more theoretical paper about software verification - but with a fairly accessible introduction and literature review. You should be able to look at sections 1-3 before the meeting. If we can get into some of the new ideas in section 4, then that's great!

22 January 2024 (10:40, MFF Malostranské nám. S10) - Tomas Petricek

- A Rhetorical Framework for Programming Language
- Evaluation
<http://cs.iit.edu/~smuller/papers/onward20-preprint.pdf>
- Short easy-to-read essay for an easy start of the new year! It looks at different claims that programming language and systems researchers make in their papers. You should be able to read the whole essay.

19 December 2023 (17:00, FIT Dejvice!) - Ondřej Kubánek (visiting from Chalmers)

- Christmas special - we will have a paper discussion at FIT with a guest and former group member and then move to a nearby (to be determined) pub.
- Location: FIT (exact location TBA): <https://maps.app.goo.gl/2tFRMnH37ZtcAF5w9>
- Paper: *A Tutorial Implementation of a Dependently Typed Lambda Calculus*
(available from <https://www.andres-loeh.de/LambdaPi/> alongside with source code).
 - This is a “basic” introduction to theory of dependent types (i.e. types that depend on expressions, like “vector of length $n+m$ ”). It is somewhat theoretical, but mostly, it is about a Haskell implementation so should be somewhat readable. The key ideas are in Section 3.
 - There is still some PL formalism. The following blog post may help:
<http://siek.blogspot.com/2012/07/crash-course-on-notation-in-programming.html>

11 December 2023 (10:40, SW1) - Multiple people

- Various demos of algebraic effect handlers
- Some sample programs to look at:
 - <https://www.eff-lang.org/try/>
 - <https://effekt-lang.org/docs/>
 - <https://koka-lang.github.io/koka/doc/book.html#tour>
- Some recommended papers include
 - An Introduction to Algebraic Effects and Handlers:
<https://www.eff-lang.org/handlers-tutorial.pdf>

- Effects as Capabilities: Effect Handlers and Lightweight Effect Polymorphism: <https://dl.acm.org/doi/pdf/10.1145/3428194>
- The following meeting report gives an overview of the research field and may be useful (at least as a starting point for more searching):
 - <https://drops.dagstuhl.de/storage/04dagstuhl-reports/volume08/issue04/18172/DagRep.8.4.104/DagRep.8.4.104.pdf>
- Please add links to other examples to look at here:
 - <https://v2.ocaml.org/manual/effects.html>
 - ...
 - ...

27 November 2023 (10:40, SW1) - Karolina Hrnčířová

- Triangulating Python Performance Issues with SCALENE
<https://www.usenix.org/conference/osdi23/presentation/berger>
- And now for something completely different :-) This is a profiling paper - you should have a look at sections 1-3 to get an idea what the work is about. Evaluation in section 6 is interesting if you are interested in methodological aspects of CS, but can be skipped. I would recommend looking at some of the use cases in section 7.

6 November 2023 (10:40, SW1) - Tomas Petricek

- Structured Editing for All: Deriving Usable Structured Editors from Grammars
<https://dl.acm.org/doi/abs/10.1145/3544548.3580785>
- This is an accessible paper applying human-computer interaction methods to programming tools. Everyone should skim-read the paper, read section 3 and read one or more other sections, so that we can discuss some aspects of the paper in detail.

List of people interested in emails

Feel free to remove yourself or add others who express interest in joining!

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Summer 2022/2023

We are meeting every other week on Tuesday, 10:40 in SW1. The person presenting the paper should read the whole thing and lead the discussion, but everyone joining is expected to read enough of the paper to be able to actively participate. For some papers, we may focus more on critique, for some papers, we may focus more on understanding the paper.

Upcoming meetings

Past meetings

23 May 2023 - Ondřej Kubánek

- Linearity and Uniqueness: An Entente Cordiale
<https://granule-project.github.io/papers/esop22-paper.pdf>

11 May 2023 - Vlastimil Dort

- Coq tutorial. Go through: https://rand.cs.uchicago.edu/cufp_2015/basics.v
Please see instructions from Vlasta: [Coq tutorial instructions](#)

25 April 2023

- Notions of computation and monads
<https://www.cs.cmu.edu/~crary/819-f09/Moggi91.pdf>

11 April 2023

- SYNCHROMESH: Reliable code generation from pre-trained language models
<https://www.vuminhle.com/pdf/iclr22.pdf>

28 March 2023

- Jeremy G. Siek & Walid Taha. Gradual Typing for Functional Languages
<http://scheme2006.cs.uchicago.edu/13-siek.pdf>

14 March 2023

- Nuno Preguiça. Conflict-free Replicated Data Types: An Overview.
<https://arxiv.org/abs/1806.10254>

Ideas for future meetings

Please add your ideas for future meetings below.

By default, we will continue meeting on Tuesday 10:40, but if it turns out that some people are only available on Thursday 10:40 and have some interesting topics, we can move one of the future meetings to Thursday.

- “Refinement Types for Valid Deep Learning Models”
 - <https://www.microsoft.com/en-us/research/uploads/prod/2021/12/refty.pdf>

- Look at something on refinement types, possibly Liquid Haskell
 - Tomas Petricek - Tuesday 10:40 or Thursday 10:40
- Compiling to Categories/Something on Linear Types (Taste of linear logic, Linear Types Can Change the World!)
 - Ondřej Kubánek - pref Tuesday 10:40
- Something along the lines of "Ghosts of Departed Proofs" by Matt Noonan
- PL theory (nothing too heavy please), programming philosophy/interdisciplinary thinking, interesting PL designs and programming tooling, AI cooperation, ...
- Monads
 - <https://www.cs.cmu.edu/~crary/819-f09/Moggi91.pdf>
- Type theory, Compilers (CPS), proof assistants
 - From answers to the earlier reading group poll
- Your idea here!
 - Your name & timing constraints