Compiler Fuzzing Course Introduction

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First: About Me

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- **Now:** Permanent researcher (CRCN) at Inria - Lille since *2022*
- **Ph.D.:** Reflection, debloating, dynamic updates

- **Keywords:** compilers, testing, test generation, performance
- **Interests:** tooling, benchmarking, 日本語, board games, batman, concurrency

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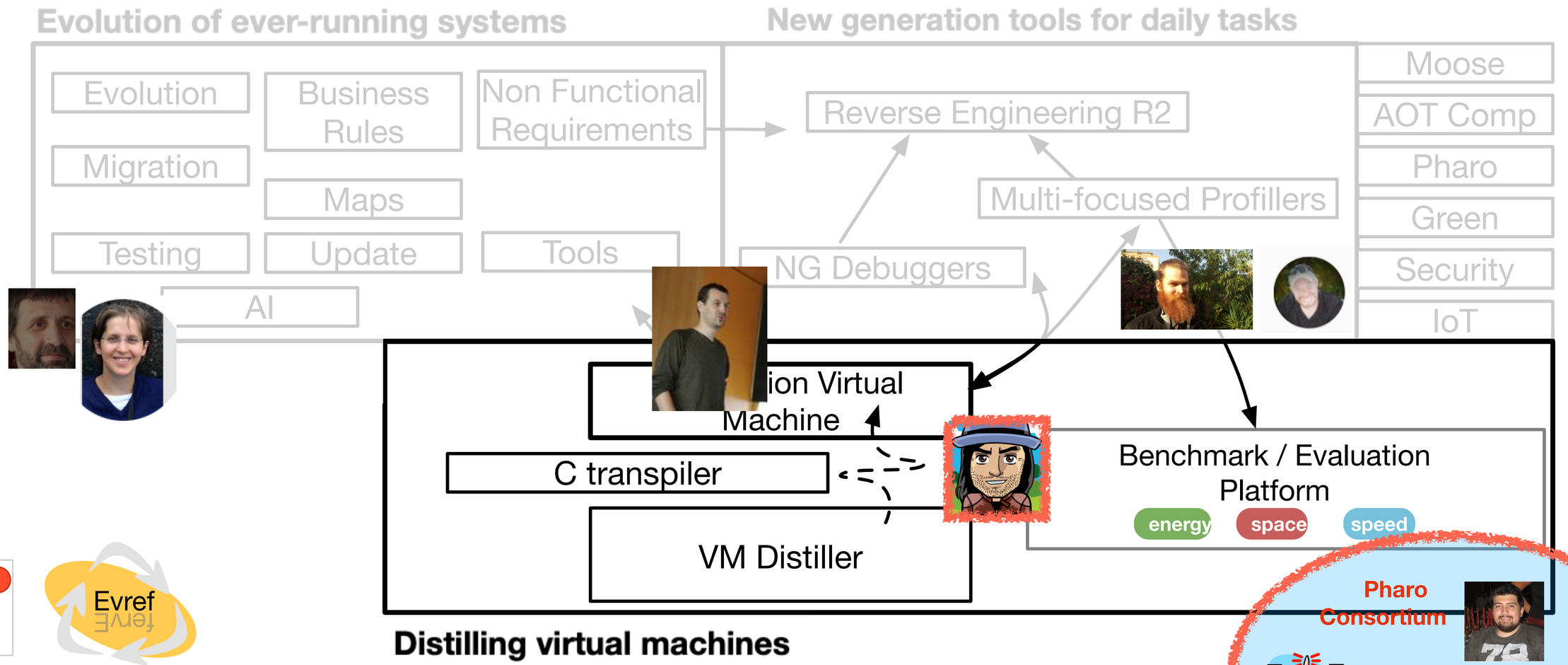
Virtual Machines



RMod

Evref

Pharo Consortium

Ongoing Projects

- Ahead-of-time Language Virtual Machine optimizations
- Benchmark generation using test generation techniques
- Allocation profilers

- We are looking for PhD students, interns and young engineers!

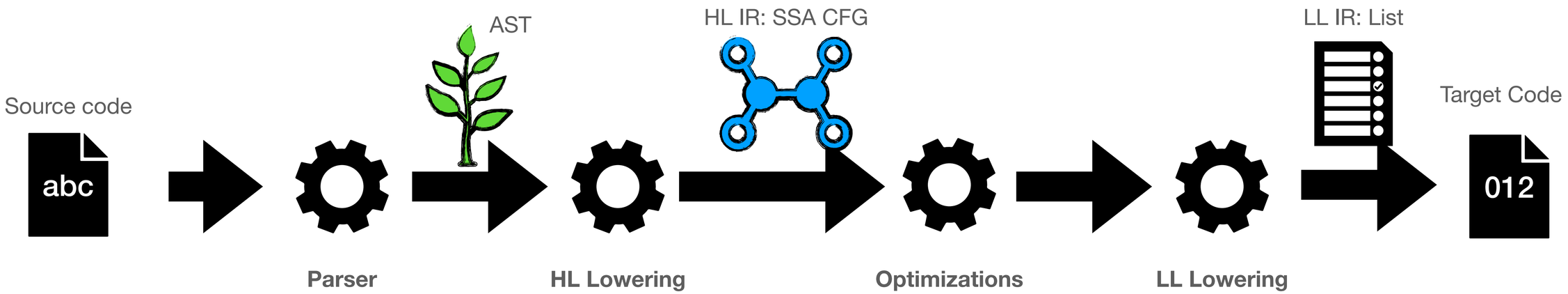
Compiler Fuzzing Course

- 10 + 2 modules
  - 2 “leveling” modules: testing and compiler architecture
  - + fuzzing, oracles, syntactic fuzzing, differential testing, advanced fuzzing

- Extra citations and material: blogs, books, papers

- Practice module based on a *buggy compiler*

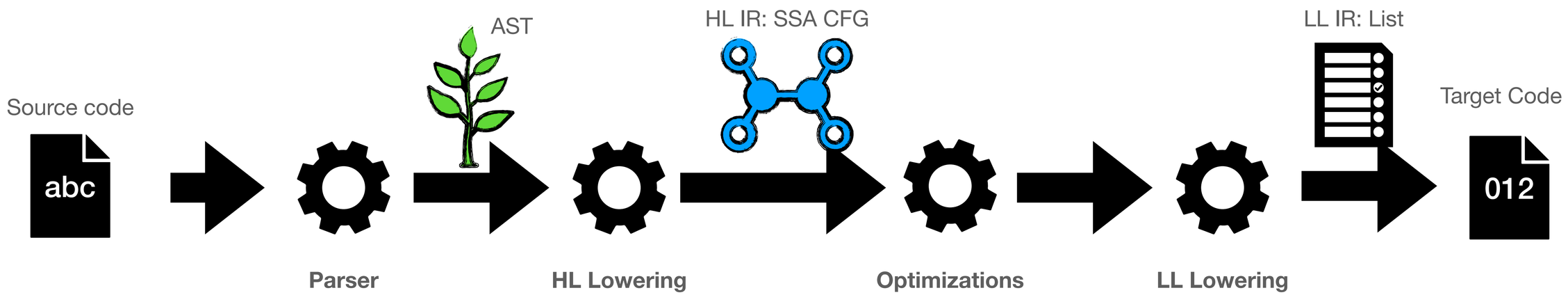
The SMIC compiler



- Autogenerated Parser — years mature
- High-level Lowering —custom
- Optimizations — >1 year mature

- Low-level Lowering - custom
- LL IR and code gen — >10 years mature

The SMIC compiler + bugs



- Potential bugs present
  - Left in purpose
  - Recently introduced
  - Architecture dependent
  - Maybe there for years and never hit

Course Evaluation

- Report PDF of course practice — in groups
  - What testing strategies have you tried
  - What bugs have you found
  - What was difficult to achieve, what was difficult to apply