

Hazel ExoLivelits

SGAI Edinburgh

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Computational Glue

- Good ideas and good GUIs need good computational glue
- The best computational substrate is a general purpose programming language
- While text is powerful, it should be one of many media in a richer compositional toolbox

Livelits - Compositional GUIs in code

- **Hazel**: Our programming language and live programming environment
- **Livelits***: Our API for creating user interfaces for domain data structures, which expand under the hood into Hazel syntax
- **ExoLivelits**: New work, embedding external apps as Livelits

*See our paper: [Filling Typed Holes with Live GUIs, PLDI2021](#)

Hazel + Petrinaut Demo

- Featuring **HASH**'s Petrinaut

Computational Commons + GAIOS

- Working in a general purpose programming language shouldn't compromise working with your system in an expressive way
- Beyond this demo our vision for Hazel is as a **computational commons**: 100s of libraries of expressive interactives supporting large scale collaboration between humans and AIs.
- We are experimenting with Ink & Switch on embedding Hazel into the GAIOS platform

Semantic Context Engineering

- Within GAOIS and SGAI we want Hazel to act as computational glue, using its semantics engine to help drive both human-oriented interfaces and AI tool use and context engineering
- Our AI thesis: Agents should be able to interact with code *as code* as opposed to merely text*, using formal semantics to build context and contextually suggest actions
- Our hope is that **even if you don't want to write Hazel code** (gasp), our structured semantics will help LLMs write the glue for you, and help them use our live programming features to explain their work

*For preliminary work, see our paper:

Statically Contextualizing Large Language Models with Typed Holes, OOPSLA2024

SGAI TA1.1 Visual Bibliography
 Collected by Andrew Blinn @ FPLab, October 2025

Given that diagrammatic interfaces like string diagrams and Petri nets are a central theme of the SGA1 implementation strategy, we decided to take a birds' eye look at how the TA1.1 teams and the resources they draw on use non-textual or extra-textual visuals for exposition and reasoning.

SOME TAKEAWAYS

- Much effort appears to be spent optimize layout for embedding diagrams in textual notation and vice versa; people want to freely compose and move between text diverse visual presentations
- Heavy use of layering strategies to condense complex information (isometric 3D, shaded backdrops, diagrams inside diagrams)
- Clean, high-level categorical diagrams (functorial, adjunctive) are popular for big picture takeaways
- Rosetta stone diagrams linking diagrams and equations are another favorite
- The closer to actual reasoning (proofs), the nastier the diagram layout and proportions get

Key Topics and Authors:

- Stochastic, Differentiable, Coloured Petri Nets (Jade Master)**
- Equation Versus Diagram**
- Monoidal Coalgebraic Metrics (Filippo Bonchi)**
- String Diagrammatic Probabilistic Logic (Pawel Sobocinski)**
- Syntax and Semantics for Multi-modal Petri Nets (Amar Hadzahasanovic & Diana-Maria Kessler)**
- Two-dimensional Kripke Semantics & Functional Logic Programming (Alex Kavvos)**
- Quantitative Predicate Logic (Ekaterina Komendantskaya)**
- Supermartingale Certificates (Mirco Giacobbe)**

- We'd love to work with you to experiment with embedding your modelling tools into Hazel, or Hazel into your tools.
- Talk to Cyrus or myself for more demos or details.
- See hazel.org for more about Hazel, and my social media (see andrewblinn.com) to track Hazel work in progress