Imperial College London
Activity Report

Nobuko Yoshida

Imperial College London

http://mrg.doc.ic.ac.uk

Current Members

- Post-doc Raymond Hu, Julien Lange, Nicholas Ng, Xinyu Niu, Alceste Scalas and Bernardo Toninho
- Pre-doc Rumyana Neykova (passed viva)
- Phd students Weizhen Yang (viva in January), Juliana Franco, Assel Altayeva and Eva Graversen

Tutorials and Invited Lectures

- ***Raymond Hu*** has been nominated for the 2016 Student Academic Choice Awards for Concurrent Models and Programming Course at Imperial.
- JLFA, Invited lectures to PhD students/Post-doc researchers, Saint-Malo, France (January 2016)
- BETTY Summer School, Invited lectures, by ***Raymond Hu***, Cyprus (July 2016)
- Keio University, Lectures to Undergraduates and Masters, Japan (August 2016)
- FM'17, Tutorial, by ***Raymond Hu***, Cyprus (November 2016)

Conference Publications

- [CC'17] ***Rumyana Neykova*** and NY, Let It Recover: Multiparty Protocol-Induced Recovery
- [FoSSaCs'17] ***Julien Lange*** and NY, On the Undecidability of Asynchronous Session Subtyping.
- [FASE'17] ***Raymond Hu*** and NY, Explicit Connection Actions in Multiparty Session Types
- [POPL'17] ***Julien Lange***, ***Nicolas Ng***, ***Bernardo Toninho***, and NY, Fencing off Go: Liveness and Safety for Channel-based Programming.
- [FPL'16] Xinyu Niu, ***Nicholas Ng***, Tomofumi Yuki, Shaojun Wang, NY and Wayne Luk, EURECA Compilation: Automatic Optimisation of Cycle-Reconfigurable Circuits.

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- [ECOOP'16] ***Alceste Scalas*** and NY, Lightweight Session Programming in Scala.
- [CC'16] ***Nicolas Ng*** and NY, Static Deadlock Detection for Concurrent Go by Global Session Graph Synthesis.
- [RC'16] Francesco Tiezzi and NY, Reversing Single Session.
- [TPFM'16] Mariangiola Dezani-Ciancaglini, Silvia Ghilezan, Svetlana Jaksic, Jovanka Pantovic and NY, Denotational and Operational Preciseness of Subtyping: A Roadmap.
- [WadlerFest'16] ***Bernardo Toninho*** and NY, Certifying Data in Multiparty Session Types.

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- [FASE'16] ***Raymond Hu*** and NY, Hybrid Session Verification through Endpoint API Generation
- [ESOP'16] ***Dimitrios Kouzapas***, Jorge A. Perez and NY, On the Relative Expressiveness of Higher-Order Session Processes.
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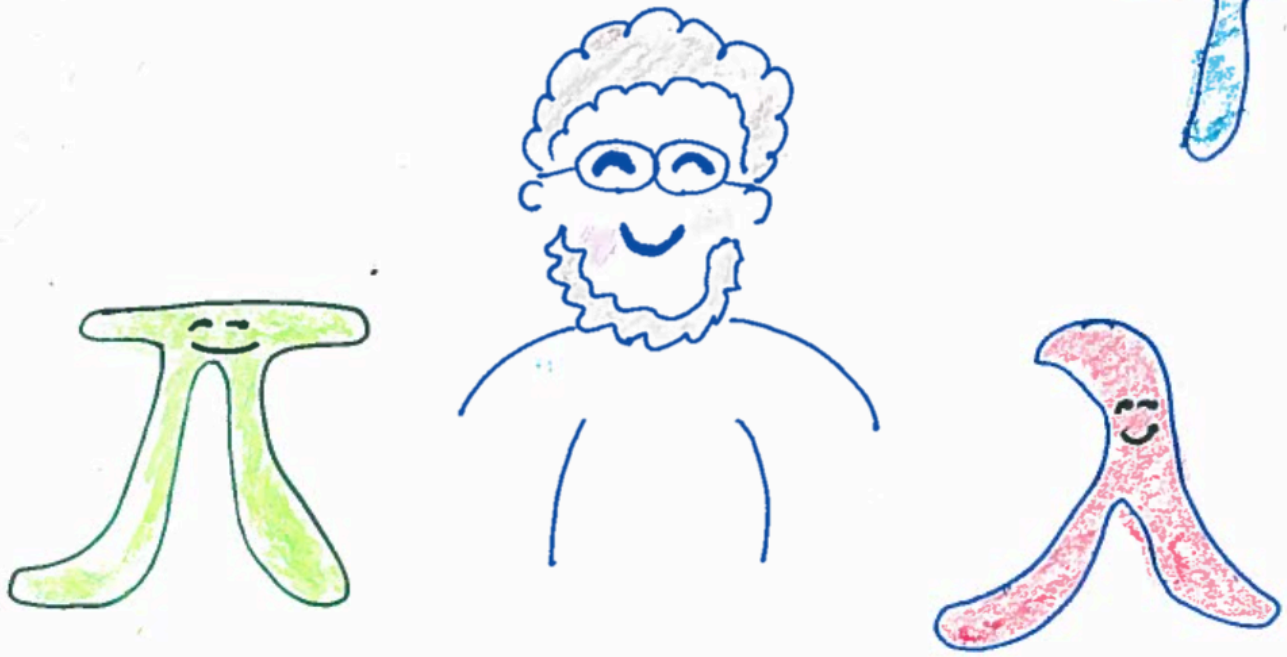
Publications (Journals)

- [JACM] Kohei Honda, NY and Marco Carbone. Multiparty asynchronous session types.
- [JLAMP] ***Bernardo Toninho*** and NY, Certifying Data in Multiparty Session Types.
- [Acta Inf] ***Dimitrios Kouzapas***, Jorge A. Perez and NY, Characteristic Bisimulation for Higher-Order Session Processes.
- [LMCS] ***Rumyana Neykova*** and NY, Multiparty Session Actors.
- [LMCS] Tzu-Chun Chen, Mariangiola Dezani-Ciancaglini, ***Alceste Scalas*** and NY, On the Preciseness of Subtyping in Session Types.
- [FPTL] Many authors with ***Raymond Hu***, ***Rumyana Neykova***, ***Nichoas Ng*** and NY, Behavioral Types in Programming Languages.

- [Acta Inf] Marco Carbone, Fabrizio Montesi, Carsten Schurmann and NY, Multiparty session types as coherence proofs.
- [LMCS] Soren Debois, Thomas Hildebrandt, Tijs Slaats and NY. Type Checking Liveness for Collaborative Processes with Bounded and Unbounded Recursion.

PHIL & SESSION TYPES



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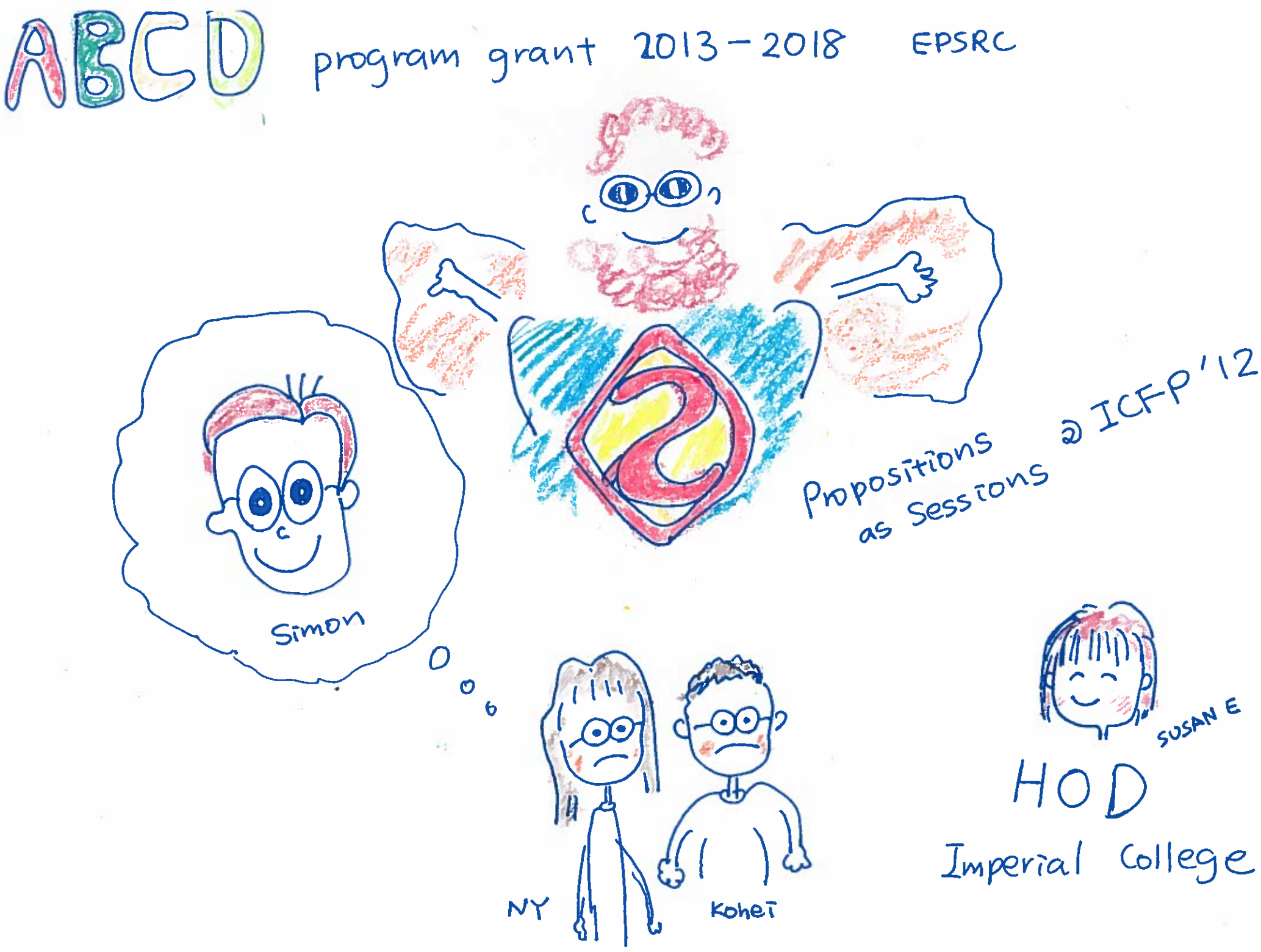
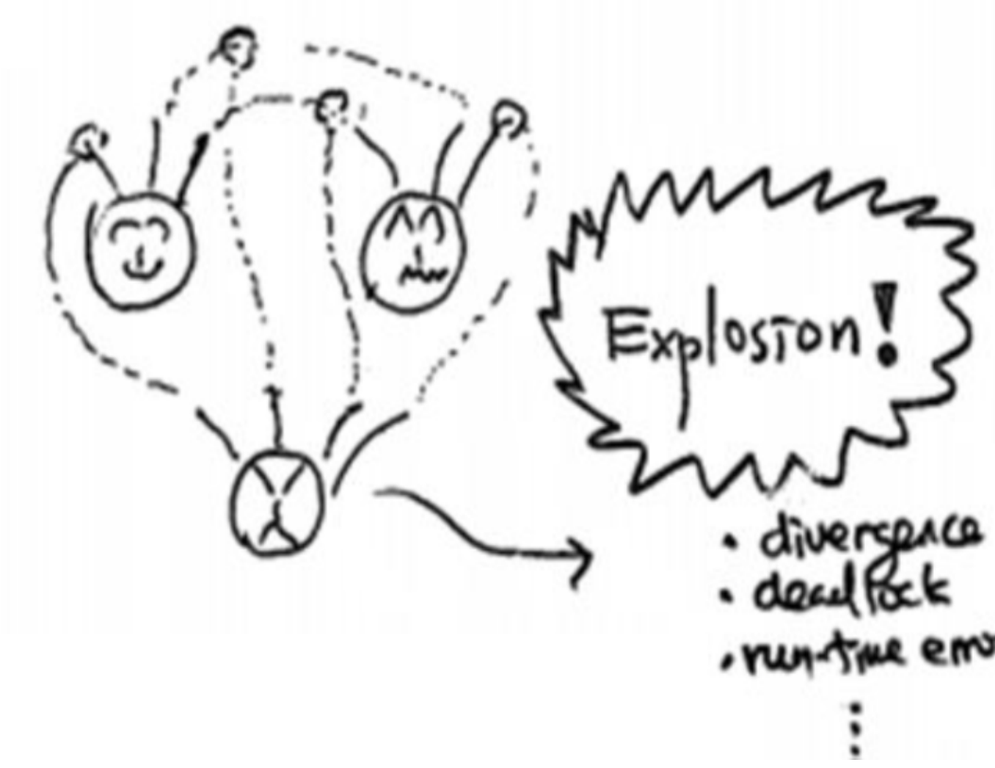
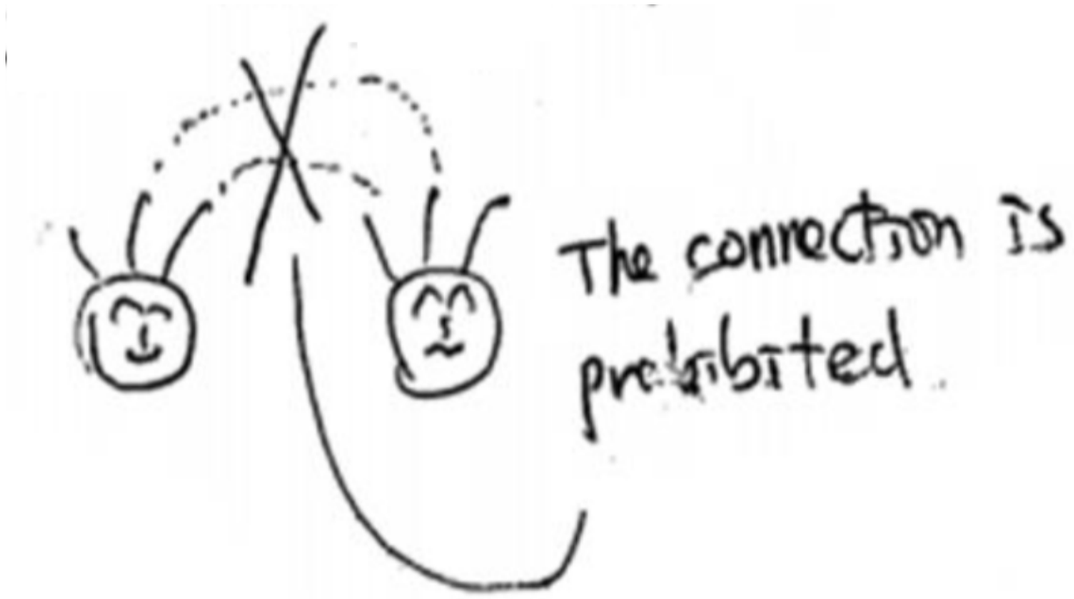

ABCD
program grant 2013–2018 EPSRC
Propositions as Sessions @ ICFP'12
Simon
NY
Kohei
SUSAN E
HOD
Imperial College

Session Types and Open Problems





Nobuko Yoshida

Betty Meeting 6th October 2016

The π-calculus as a Descriptive Tool

λ $\quad M ::= x \mid \lambda x.M \mid MN$

π $\quad P ::= \Sigma \pi_i.P_i \mid P|Q \mid (\nu x)P \mid !P \mid \emptyset.$

with $\quad \pi ::= x(\tilde{y}) \mid \bar{x}\langle \tilde{y} \rangle.$

λ in π

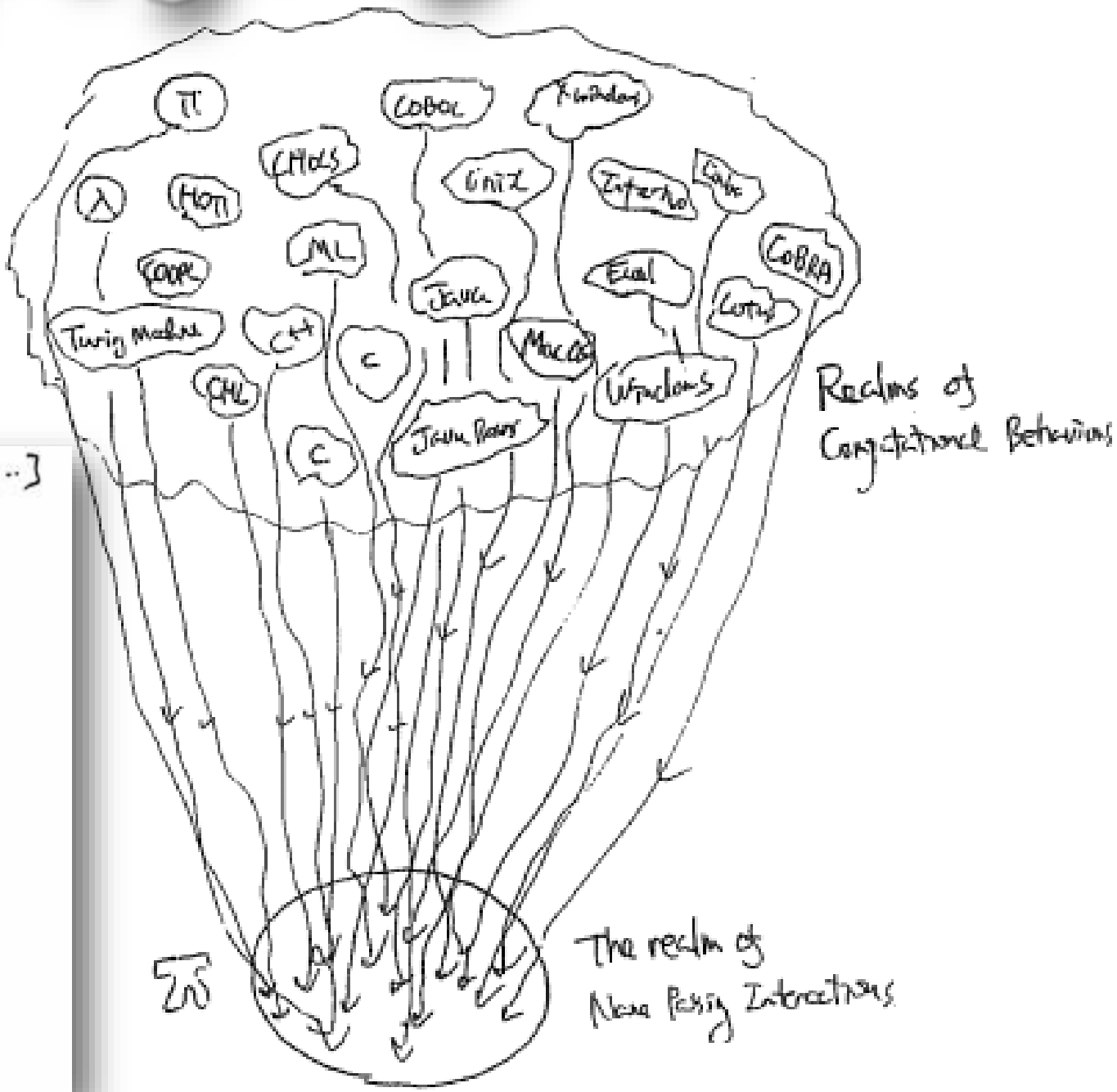
$[\![x]\!]_u \stackrel{\text{def}}{=} \bar{x}\langle u \rangle.$

$[\![\lambda x.M]\!]_u \stackrel{\text{def}}{=} u(x u').[\![M]\!]_{u'}.$

$[\![MN]\!]_u \stackrel{\text{def}}{=} (\nu f x)\left([\![M]\!]_f \mid \bar{f}\langle x u \rangle \mid [\![x=N]\!]\right)$

with $[\![x=N]\!] \stackrel{\text{def}}{=} !x(u').[\![N]\!]_{u'}.$

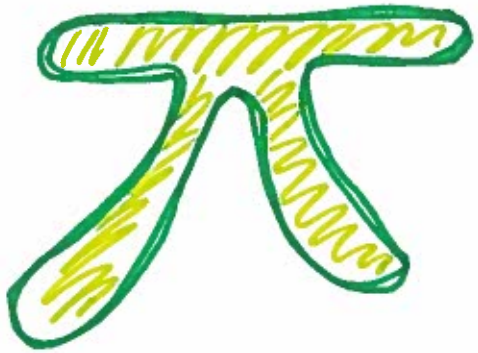
* Examples of Representable Computation.



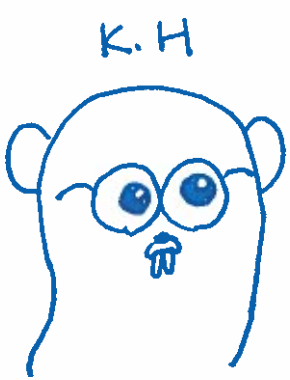
- λ-calculus [MPW89, Milner90, Milner92, ...]
- Concurrent Object [Walker91]
- ω-order term passing [Sangiorgi 92]
- Various data structures [Milner 92, ...]
- Proof Nets [Bellin and Scott 93]
- Arbitrary "constant" interaction [HYS4]
- strategies on Games [HO95]

⋮

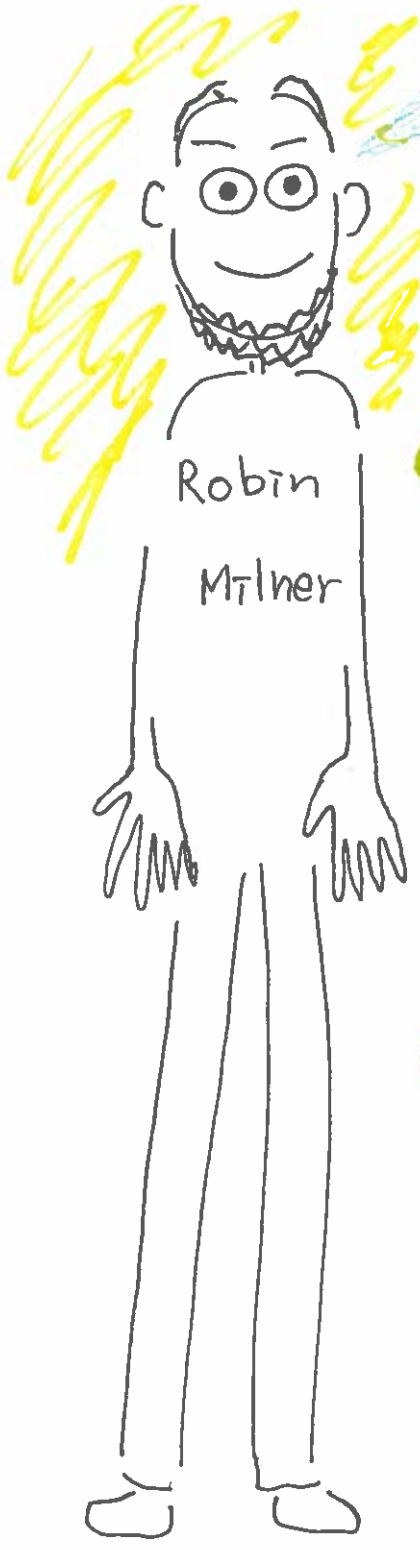
Cambridge

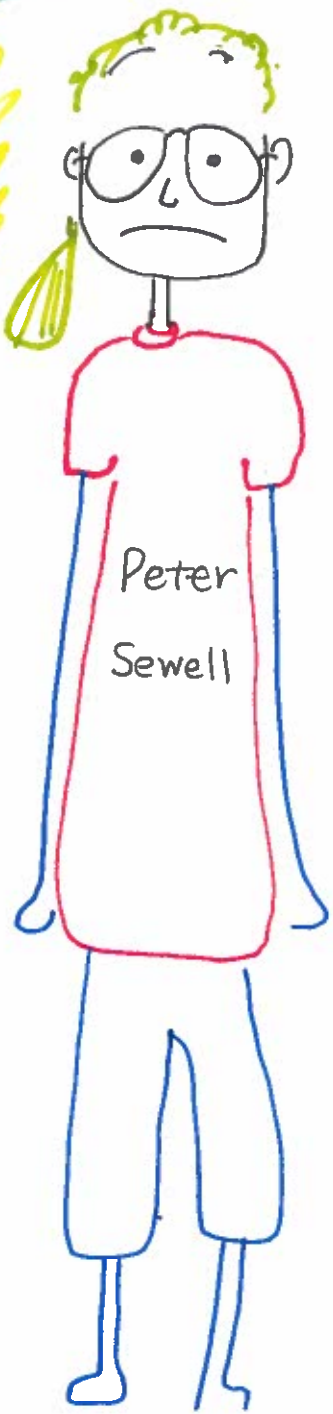



N.Y.


K.H


Adriana
Compagnoni


Robin
Milner


Peter
Sewell


Benjamin
Pierce

Invited Talks and Seminars

- Excluding Meetings and Conference presentations.
- Rumyana Neykova, Seminars at Uppsala and Camerino (February and April 2016)
- Alceste Scalas, Seminar at Novi Sad (March 2016)
- Raymond Hu, Seminar at Manchester Uni (June 2016)
- Julien Lange, Seminars at Southern Denmark and Paris 7 (August and November 2016)
- Bernardo Thoninho and Nicholas Ng, Cambridge (November 2016)
- NY, Dagstuhl, Pennsylvania, NII, Nagoya, Lisbon (Keynote talk), Berkeley and Paris 6

Industry Partners

- Red Hat: Gary Brown, Mark Little
- Thoughtswork: Steve-Ross Talbot
- The November Group LLC: Matthew Arrott
- Cognizant (Zero Deviation Life Cycle Platform)

  Bippin Makoond, Shyam.Chivukula, Anoop Chaturve, Venkatesh Shivalingaiah.
- Weaveworks

  Matthias Radestock and Alexis Richardson

Plans

- Industry-oriented workshop (next year)
- Collaborations with Industry Partners
- Investigations of use cases (P1,P2,P4,P6)
- Stable Scribble with asssertions (Java/F♯) (P1,P2,P4,P5,P6)
- Actor Extension (Erlang/Scala) (P1,P2,P4,P6)
- Applications of synthesis, automata and model checking (Go) (P4,P7)
- Behavioural theories and logical analysis of multiparty sessions (P7)