

Integration of Neural Systems

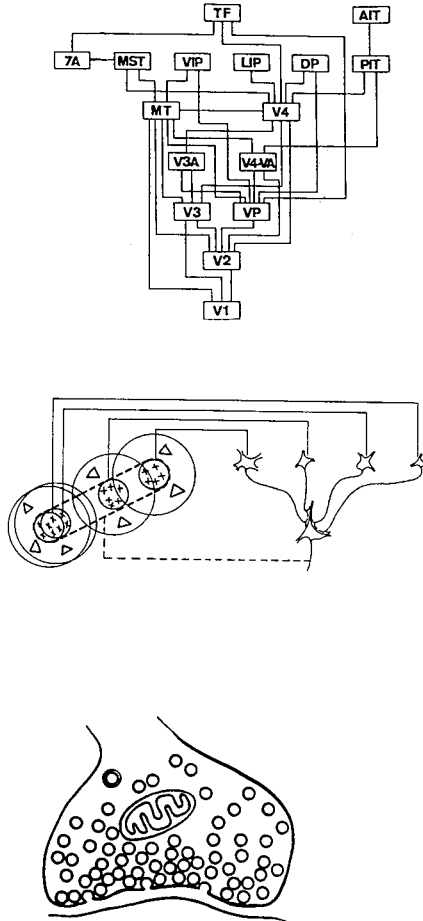
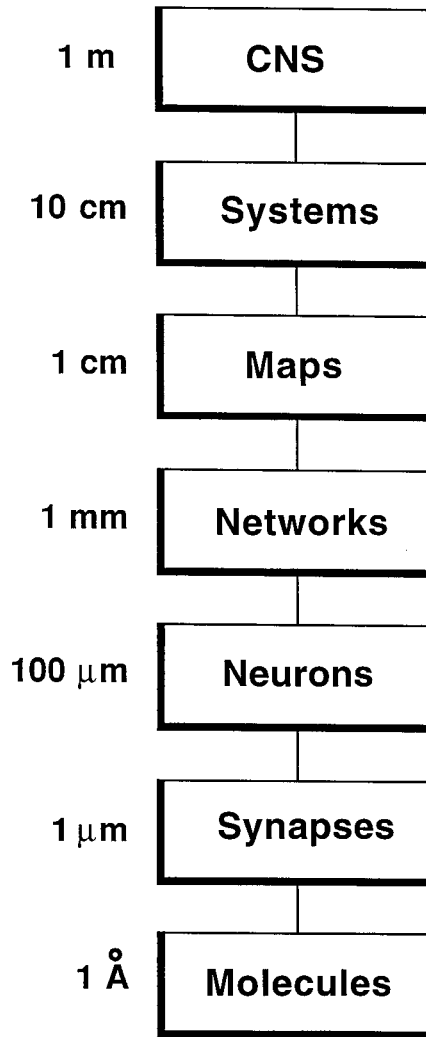
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Levels of Investigation



- Models that are:
- large
 - collaborative
 - multiple contexts
 - heterogeneous

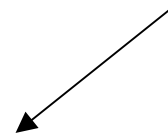
Resource Constraints

“man-to-the-moon” scenario

- well-funded
- strong management
- comprehensive training

“academic research” scenario

- few funds
- many small independent teams
- little training



Resistance to imposed constraints

- (perceived) lack of effectiveness
- (perceived) lack of suitability
- required learning curve
- negative impact on creativity

Sharing

Rebuilding published work

- ✓ rebuilding validates the work
- ✗ publication may be incomplete
- ✓ rebuilding ensures understanding
- ✗ costly

Integrating work as components

- ✗ components aren't validated
- ✓ a component is complete
- ✗ black boxes preclude understanding
- ✓ cheap and scalable

Multiple Target Implementations

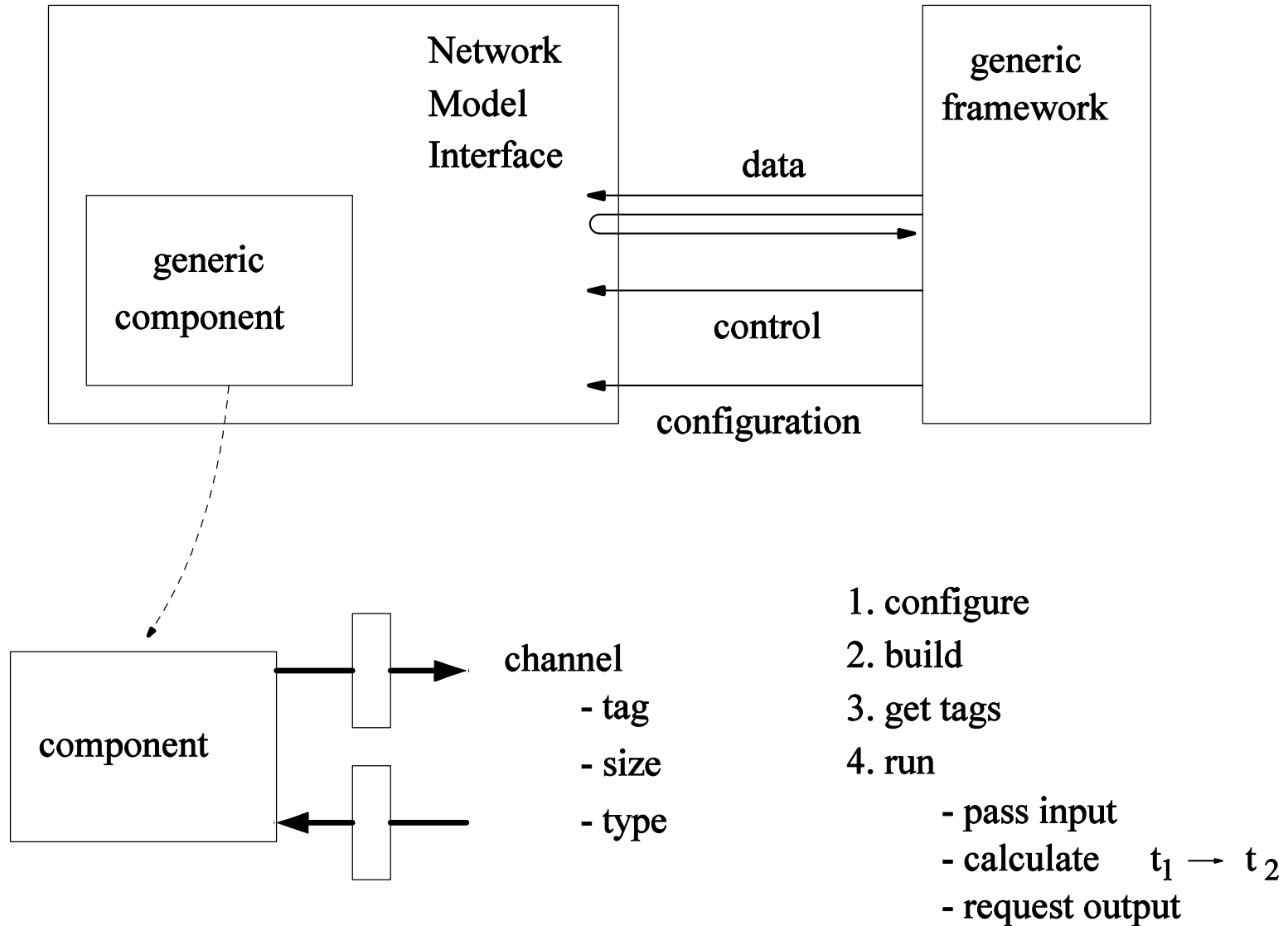
The use of a model and its components by **multiple researchers** and within the context of **multiple tasks** implies a **range of target implementations**:

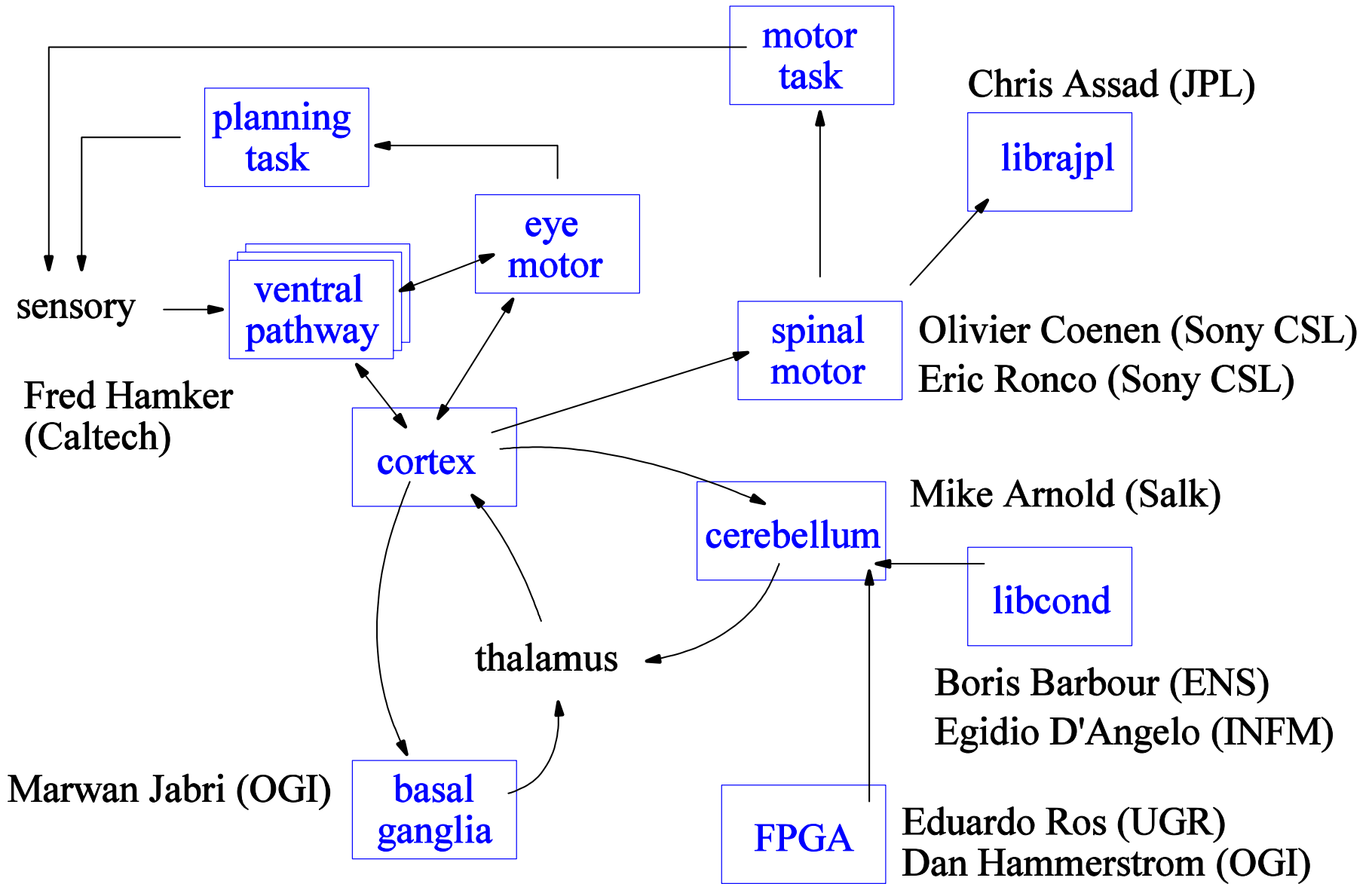
- simulated task or real task
- virtual time or real time
- range of engineering and hardware constraints
- range of memory models
- use of specialised hardware such as aVLSI and digital hardware

Integration-centric Approach

- integrate existing work
 - invariant to target implementation
 - little training
 - low risk
- } flexibility and reusability
- } low barriers to use
- validation ???
 - sufficient understanding ???

Network Model Interface (NMI)





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Documentation

www.cnl.salk.edu/~mikea/doc/libnmi/libnmi.html

Sony CSL

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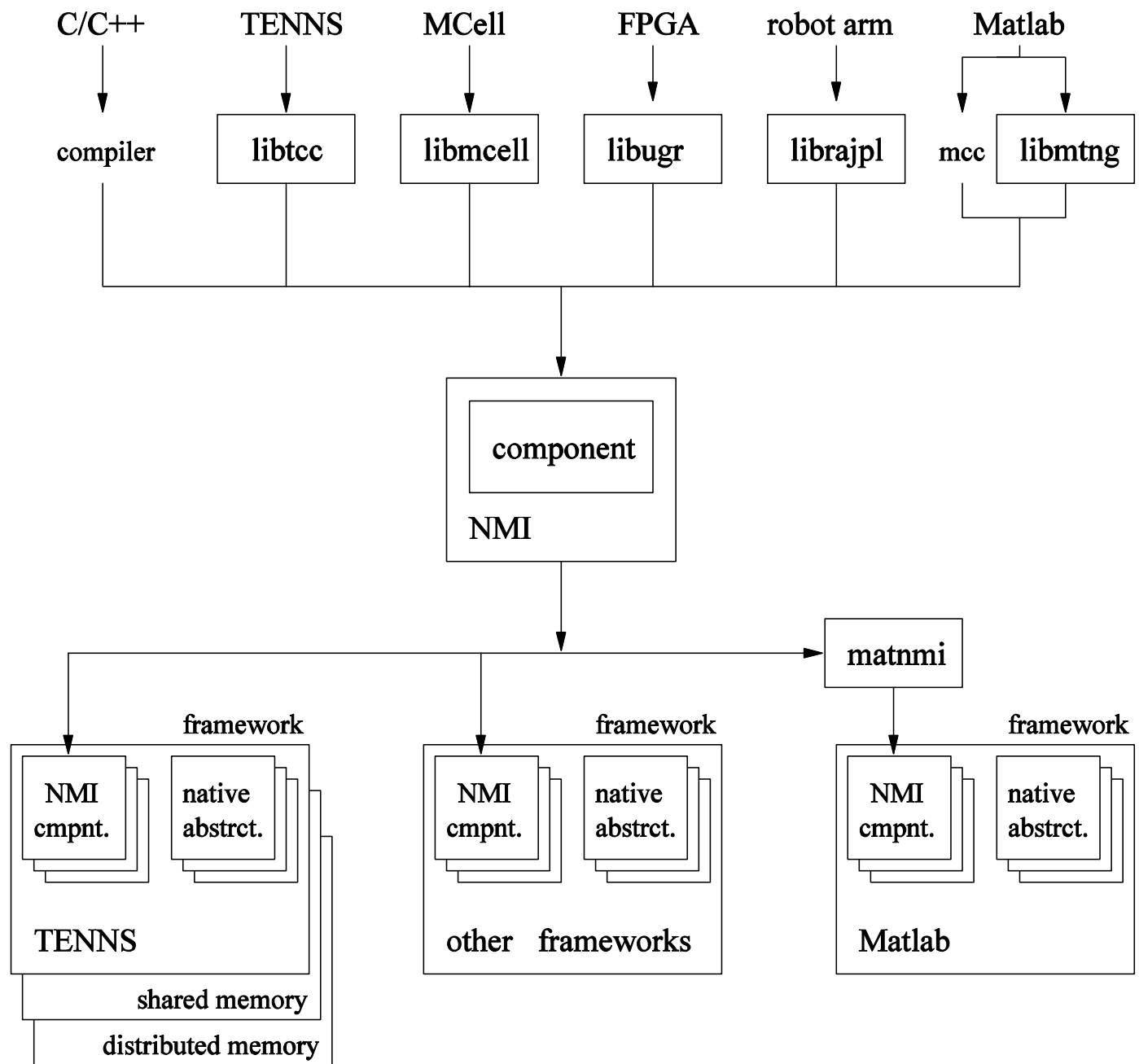
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NMI: Issues and Summary

- sharing components
- **what to standardize:** the interface not the framework
- NMI requires a working group

- development of modeling methodologies that understand the balance between the science and the engineering
- managing collaborations
- validation of components
- ensuring sufficient understanding of components

- We don't really know what the issues are, NMI offers a shortest path to studying the problem at first hand.