A Design Space Analysis of Availability-Sharing Systems

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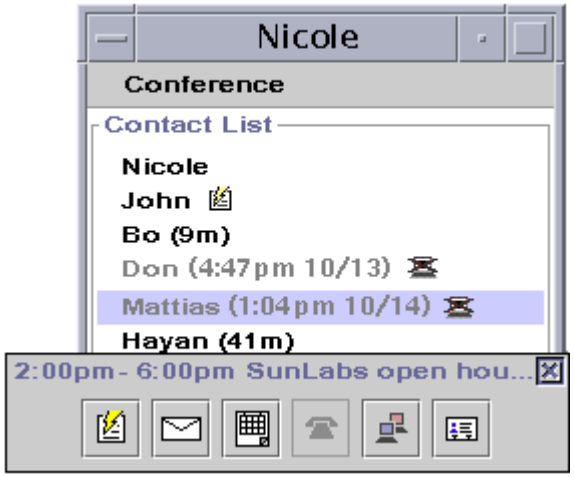
UCIrvine

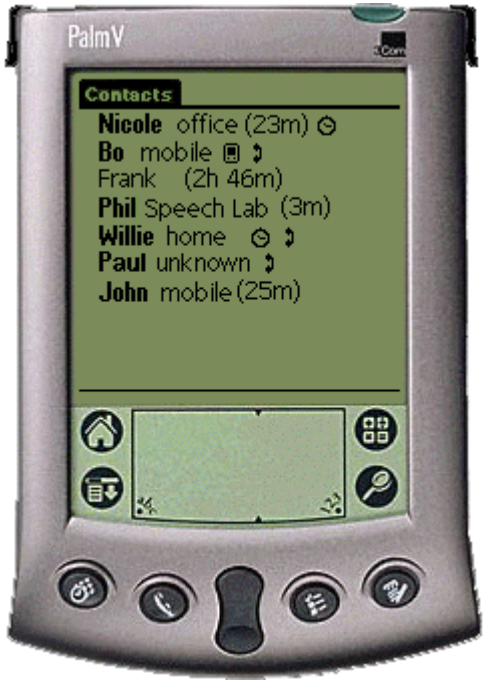
(Photo taken from: http://people.cs.vt.edu/~srh/SteveHarrisonProjectsPARC.html)

Fish et al. 92 and Tang et al 94

ConNexus



Awarenex



Tang et al. 01

Lai et al. 02

Availability-Sharing Systems

~20 years: Good Results
Low Adoption

1. How to design such systems?
2. Tradeoffs for interrupter & interruptee?
3. Present a system design that balances needs.

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McFarlane ’97, McFarlane and Latorella ´02, Matthews et al. ‘04, Pousman and Stasko ‘06, Tomitsch et al. ‘07, Jonsson et al’ 08, Markopoulos ’09, Garcia et al. ‘10

Source of the Interruption	Context Awareness	Location
Characteristics/Interruptee	Abstraction	Dynamism of Input
Method of coordination	Notification Level	Source
Meaning of interruption	Transition	Precision
Method of expression	Abstraction	Notification Level
Channel of conveyance	Notification Level	Private-vs-Shared
Human activity changed	Information Capacity	Place-vs-People
Effect of interruption	Aesthetic Emphasis	Input Automation
Personal-vs-Public	Abstraction	Accuracy
Focus-Peripheral	Notification Level	User Control Level
Explicitness	Transition	Notification Level
Modality	Modality	Localization of the AIS
Information Filtering	Temporal Gradient	Strategy to Assist
Coordination and Freq.	Representation	Orientation of the Activity

McFarlane ’97, McFarlane and Latorella ´02, Matthews et al. ‘04, Pousman and Stasko ‘06, Tomitsch et al. ‘07, Jonsson et al’ 08, Markopoulos ’09, Garcia et al. ‘10

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Context Awareness

Abstraction

Dynamism of Input

Method of coordination

Notification Level

Source

Precision

Method of expression

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Channel of conveyance

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Information Capacity

Personal-vs-Public

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Explicitness

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Modality

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Temporal Gradient

Coordination and Freq.

Representation

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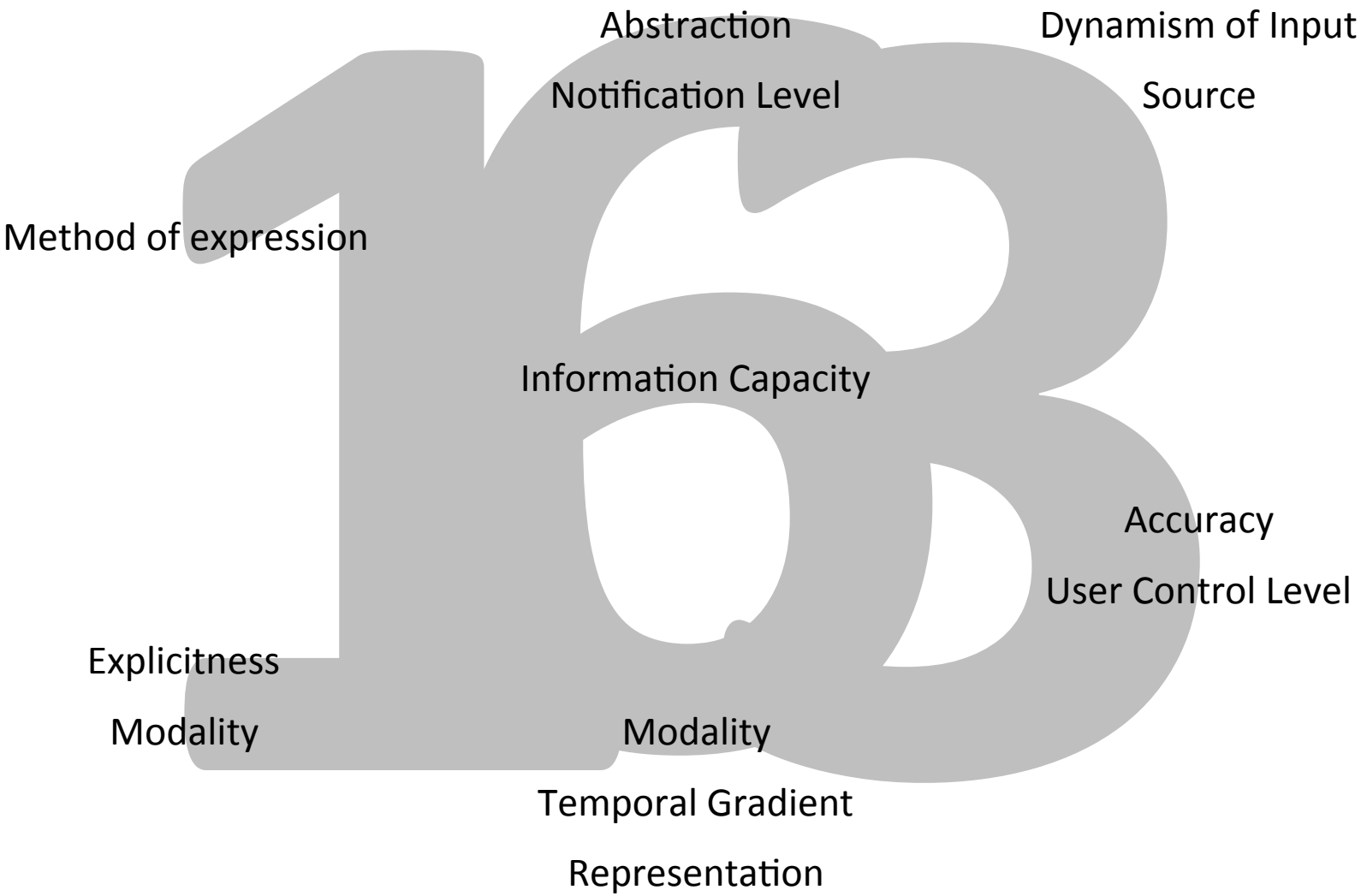

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Abstraction

Information Delivery

Values			
Sensor Data	Availability	Natural	MultiMedia
Continuous	Discrete		Literal
Always On	Almost AO	On Request	Implicit
Symm-Trac	Symm-Blind	Asymm-Trac	Asymm-Blind
Focal	Selec-Focal	Secondary	Peripheral
Historical	Recent	Current	Predicted

Symmetry

Obtrusiveness

Temporal Gradient

Presentation

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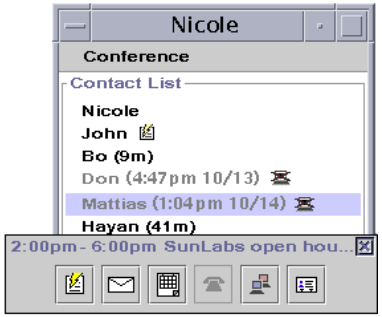
1. How to design such systems?
2. **Tradeoffs for interrupter & interruptee?**
3. Present a system design that balances needs.

Design Tradeoffs – M.S.

Dimension	Values			
Abstraction	Sensor Data	Availability	**Natural**	MultiMedia
Presentation	Continuous	Discrete		**Literal**
Inf. Delivery	**Always On**	Almost AO	On Request	Implicit
Symmetry	**Symm-Trac**	Symm-Blind	Asymm-Trac	Asymm-Blind
Obtrusiveness	Focal	Selec-Focal	**Secondary**	Peripheral
Temporal Gradient	Historical	Recent	**Current**	Predicted

Interrupter 

Interruptee 



Design Tradeoffs - App

Dimension	Values			
Abstraction	**Sensor Data**	Availability	Natural	MultiMedia
Presentation	Continuous	**Discrete**		Literal
Inf. Delivery	Always On	**Almost AO**	On Request	Implicit
Symmetry	Symm-Trac	**Symm-Blind**	Asymm-Trac	Asymm-Blind
Obtrusiveness	Focal	**Selec-Focal**	Secondary	Peripheral
Temporal Gradient	Historical	**Recent**	Current	Predicted

Interrupter 

Interruptee 

Tradeoffs - Interruptee

Dimensions	Optimal Values—Interruptee			
Abstraction	Sensor	**Avail.**	Natural	MM
Presentation	**Cont.**	**Discrete**		Literal
Information Delivery	Always	Almost	Request	Implicit
Symmetry	S(T)	S(B)	A(T)	A(B)
Obtrusiveness	Focal	Selective	Appliance	Periph.
Temporal Gradient	**Hist.**	Recent	**Current**	**Predict.**

Tradeoffs - Interrupter

Dimensions	Optimal Values—Interrupter			
Abstraction	Sensor	Avail.	Natural	MM
Presentation	Cont.	Discrete		Literal
Information Delivery	Always	Almost	Request	Implicit
Symmetry	S(T)	S(B)	A(T)	A(B)
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Temporal Gradient	Hist.	Recent	Current	Predict.

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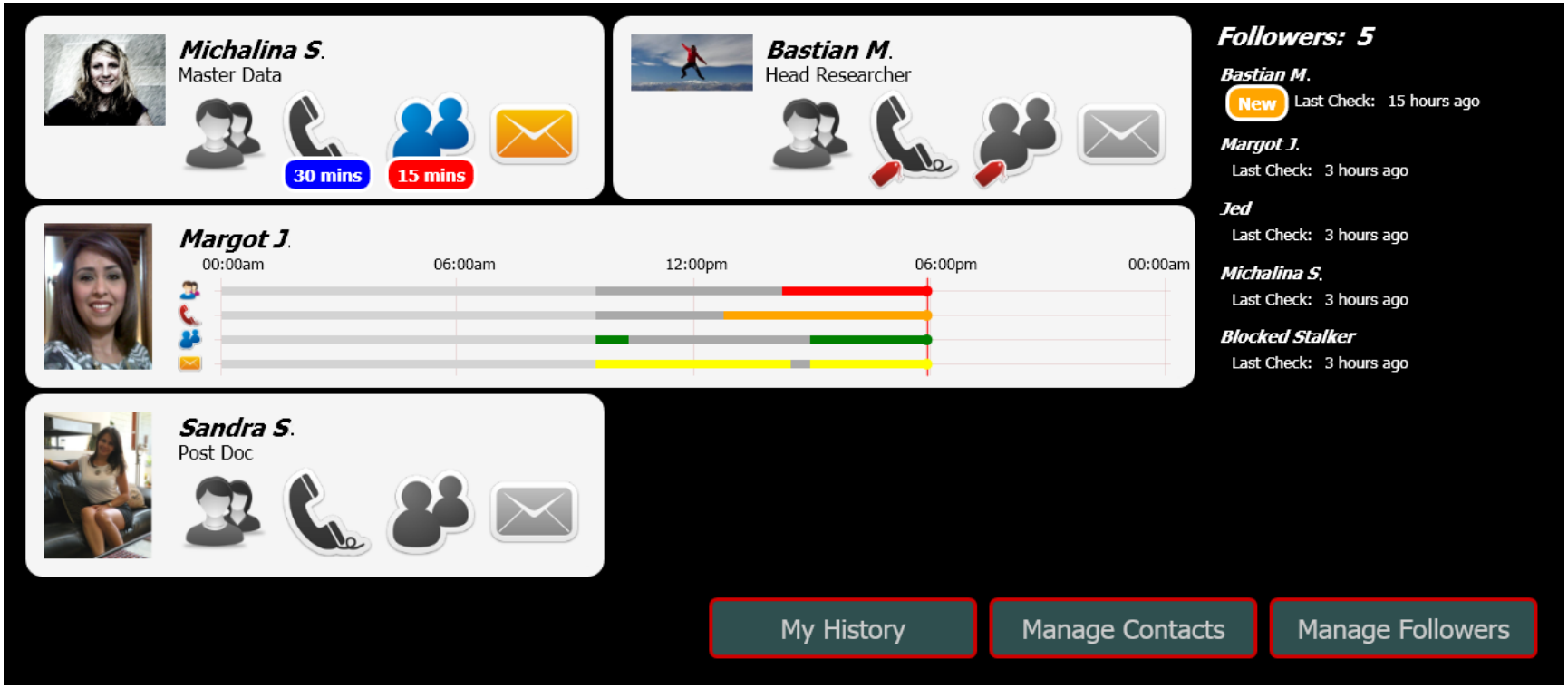
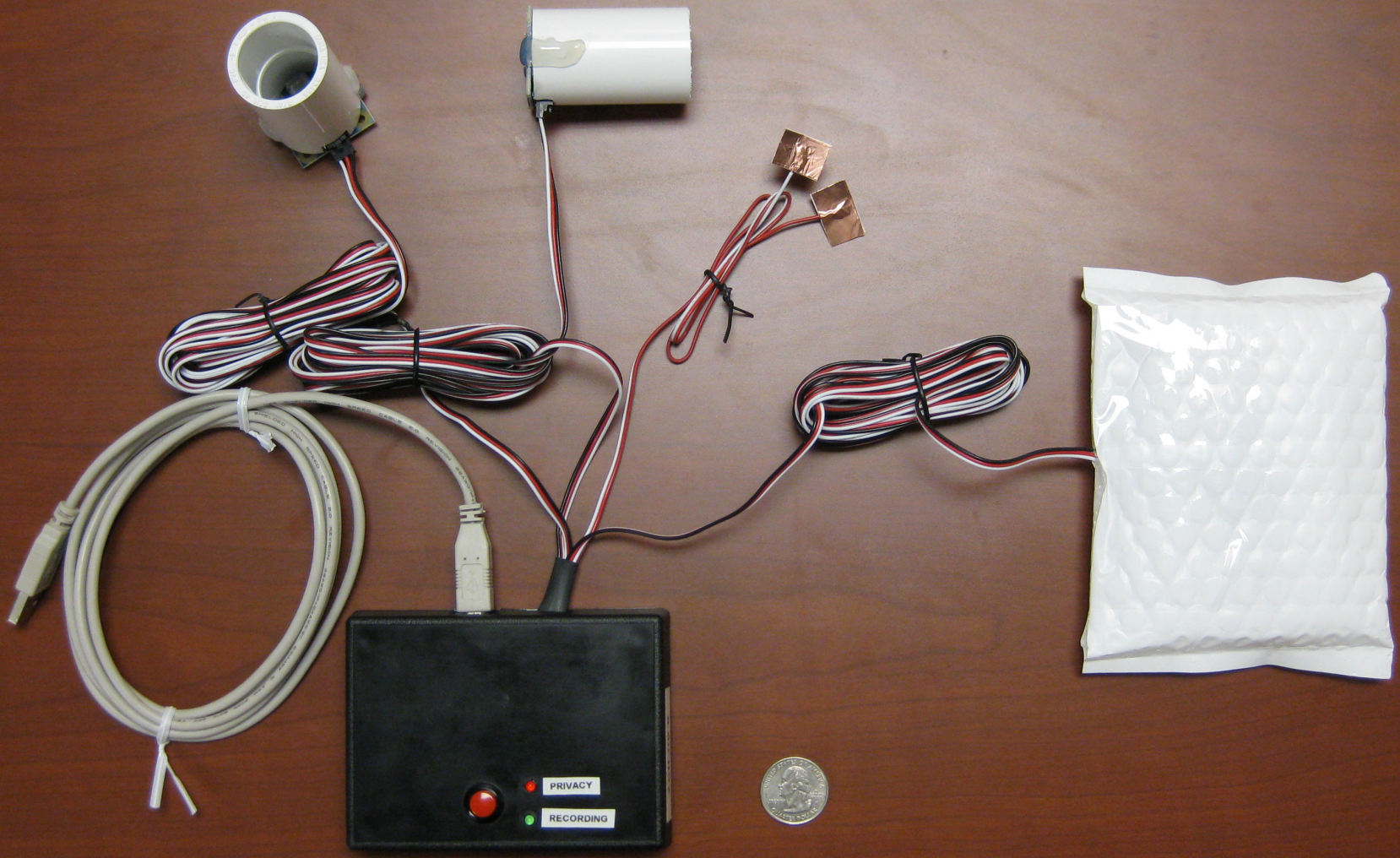
System Design - InterruptMe




PRIVACY
RECORDING

Dimensions	Design Solution—InterruptMe			
Abstraction	Sensor	Avail.	Natural	MM
Presentation	Cont.	Discrete		Literal
Information Delivery	Always	Almost	Request	Implicit
Symmetry	S(T)	S(B)	A(T)	A(B)
Obtrusiveness	Focal	Selective	Appliance	Periph.
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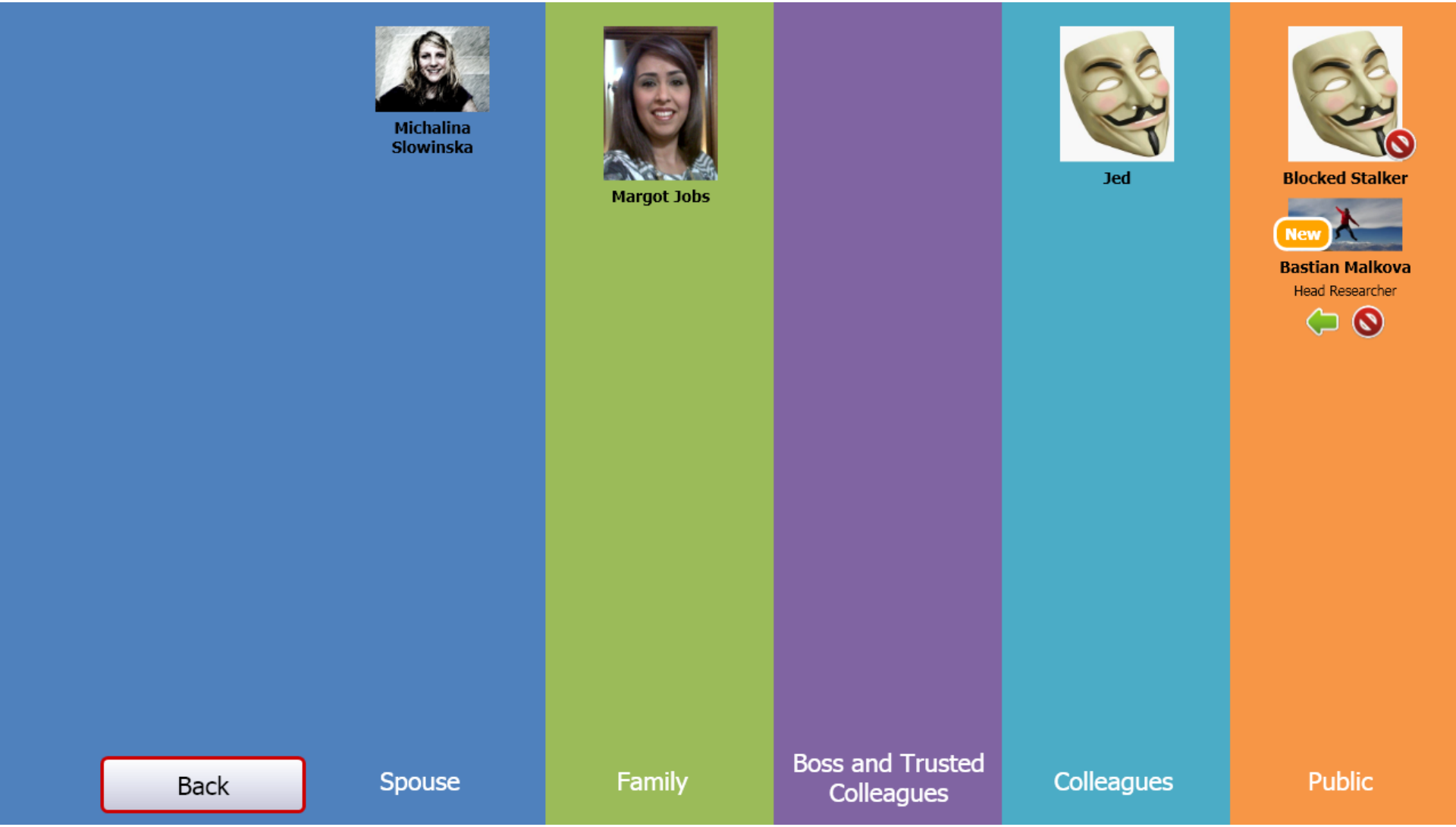
Abstraction

Information Delivery

Symmetry


Michalina Slowinska
Margot Jobs
Jed
Blocked Stalker
New
Bastian Malkova
Head Researcher
Back
Spouse
Family
Boss and Trusted Colleagues
Colleagues
Public

Conclusions and Future Work

- Design space for availability-sharing systems.
- Analyzed the tradeoffs between Interrupters and Interruptees
- Used the definition to propose a new system with three novel contributions:
  - Multiple availabilities
  - Group-based Traceable-Asymmetry
  - Projector-based Information Delivery

- Long term deployment and improvements in the software, hardware and reasoning engine.
- Come see our demo.

Thank you!

PIT LAB
The Pervasive Interaction Technology Lab

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UCIRVINE

Questions?