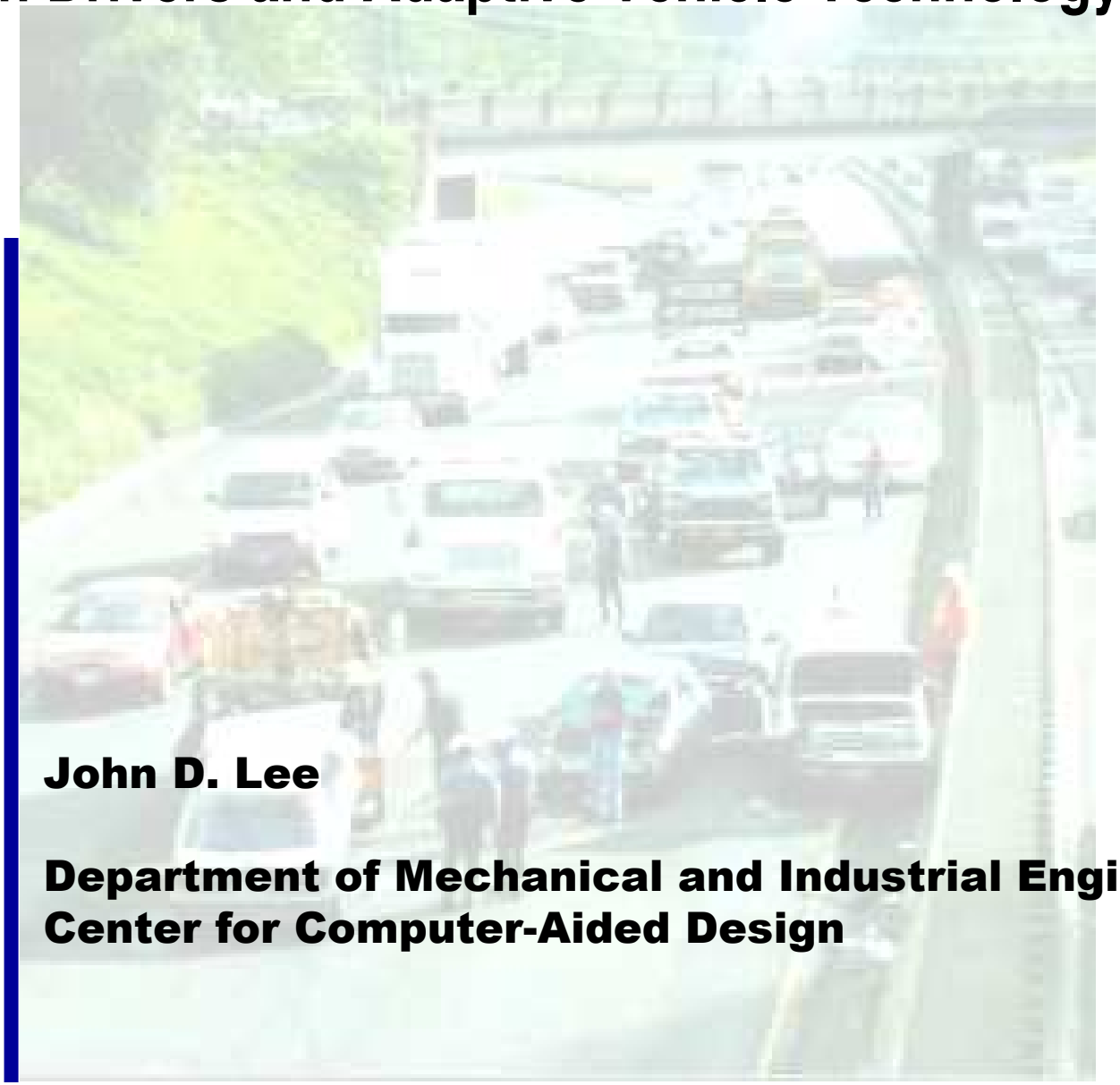
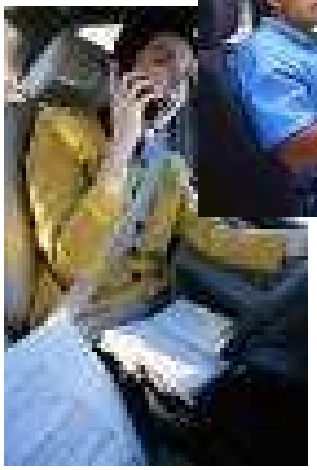
Teen Drivers and Adaptive Vehicle Technology



John D. Lee

Department of Mechanical and Industrial Engineering
Center for Computer-Aided Design

Increasingly distracting technology



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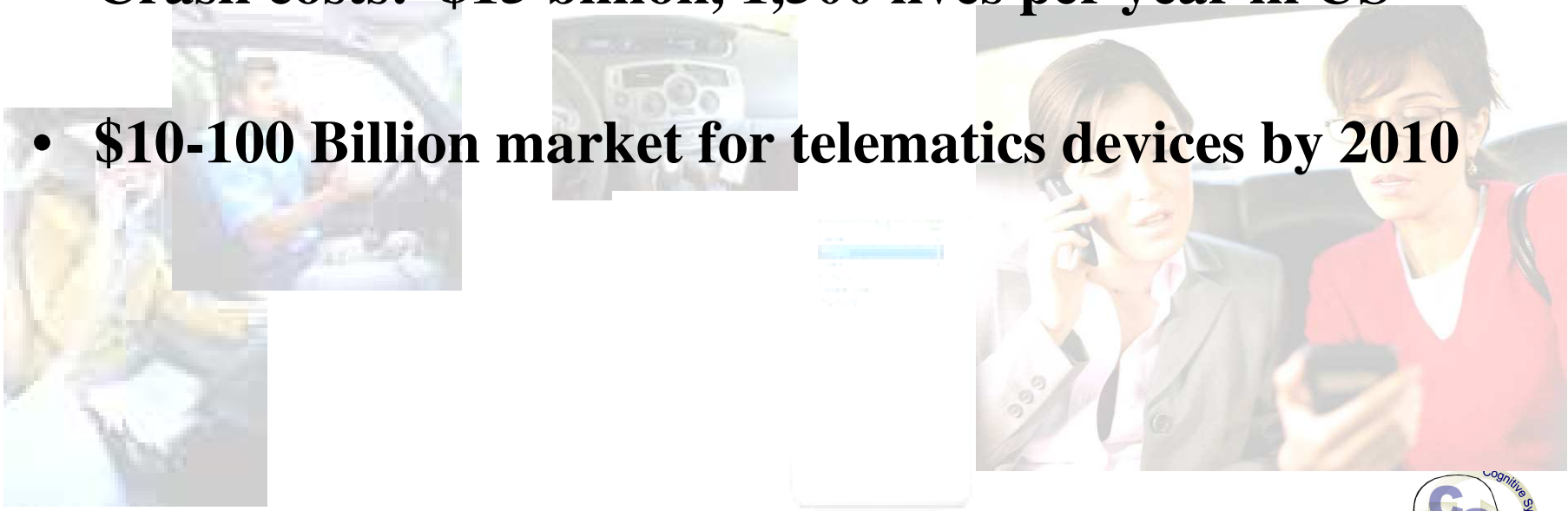
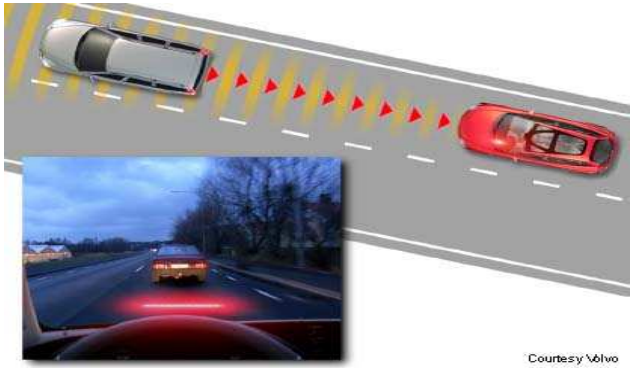
Technology trends

- 85% of those who have phone use it while driving
- 60% of total cellphone usage is while driving
- 8% of drivers on the road are talking on the phone
- 20-80% of crashes situations involve distraction
- Crash costs: $15 billion, 1,500 lives per year in US

- $10-100 Billion market for telematics devices by 2010



Increasingly powerful driver support systems



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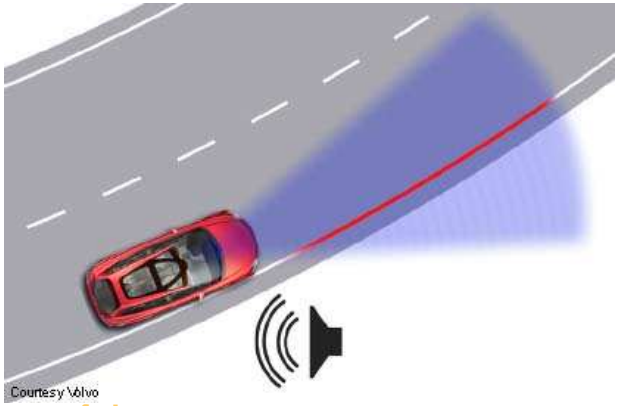
Brake lamps, forward collision warnings, brake assist



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Lane markings, road departure warnings, steering assist

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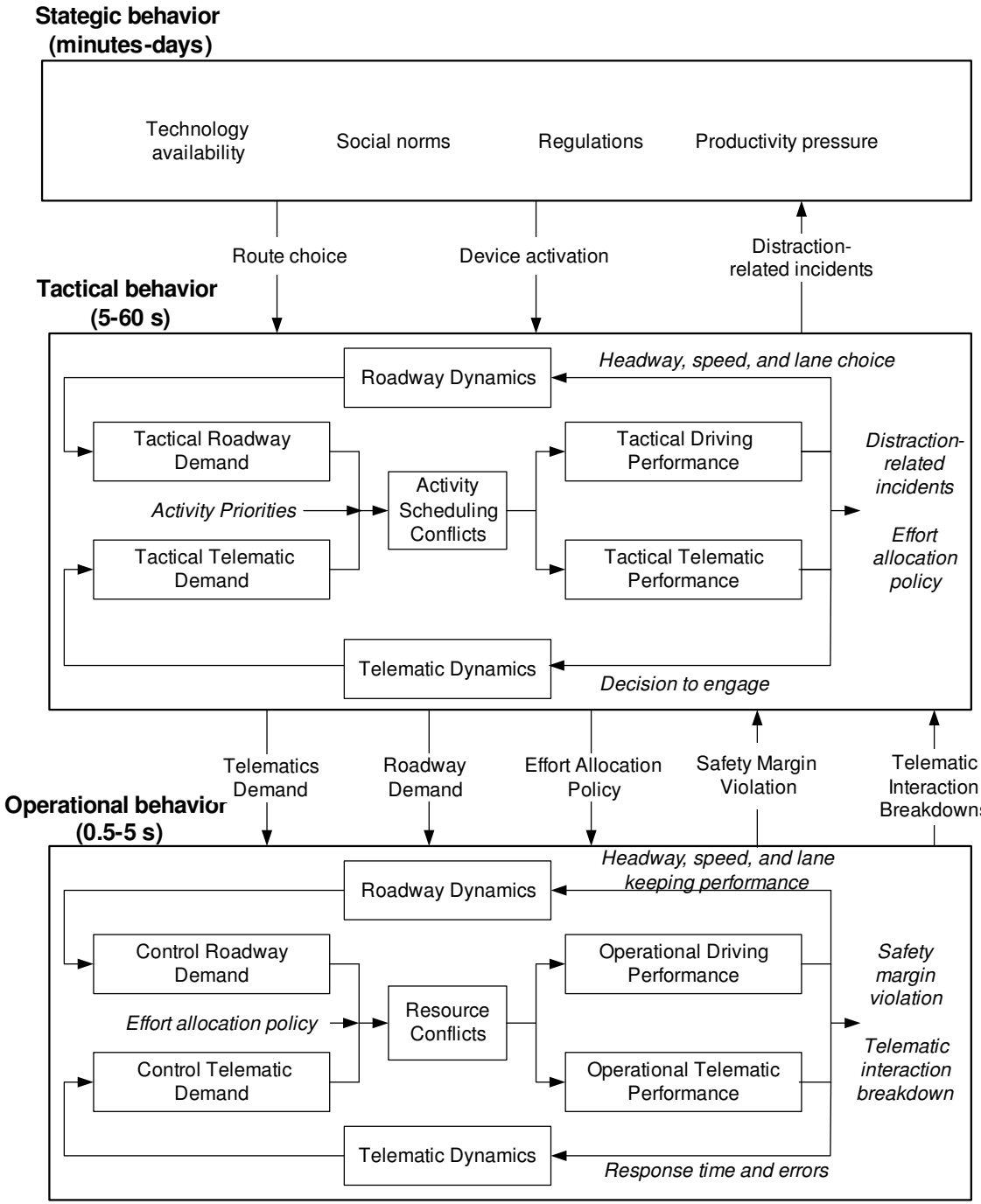
Cognitive Systems Laboratory

Potential mitigation strategies

LEVEL OF AUTOMATION	DRIVING RELATED STRATEGIES		NON-DRIVING RELATED STRATEGIES	
	System Initiated	Driver Initiated	System Initiated	Driver Initiated
High	*Intervening*	*Delegating*	*Locking & Interrupting*	*Controls Pre-setting*
Moderate	*Warning*	*Warning Tailoring*	*Prioritizing & Filtering*	*Place-keeping*
Low	*Informing*	*Perception Augmenting*	*Advising*	*Demand Minimizing*



Strategic

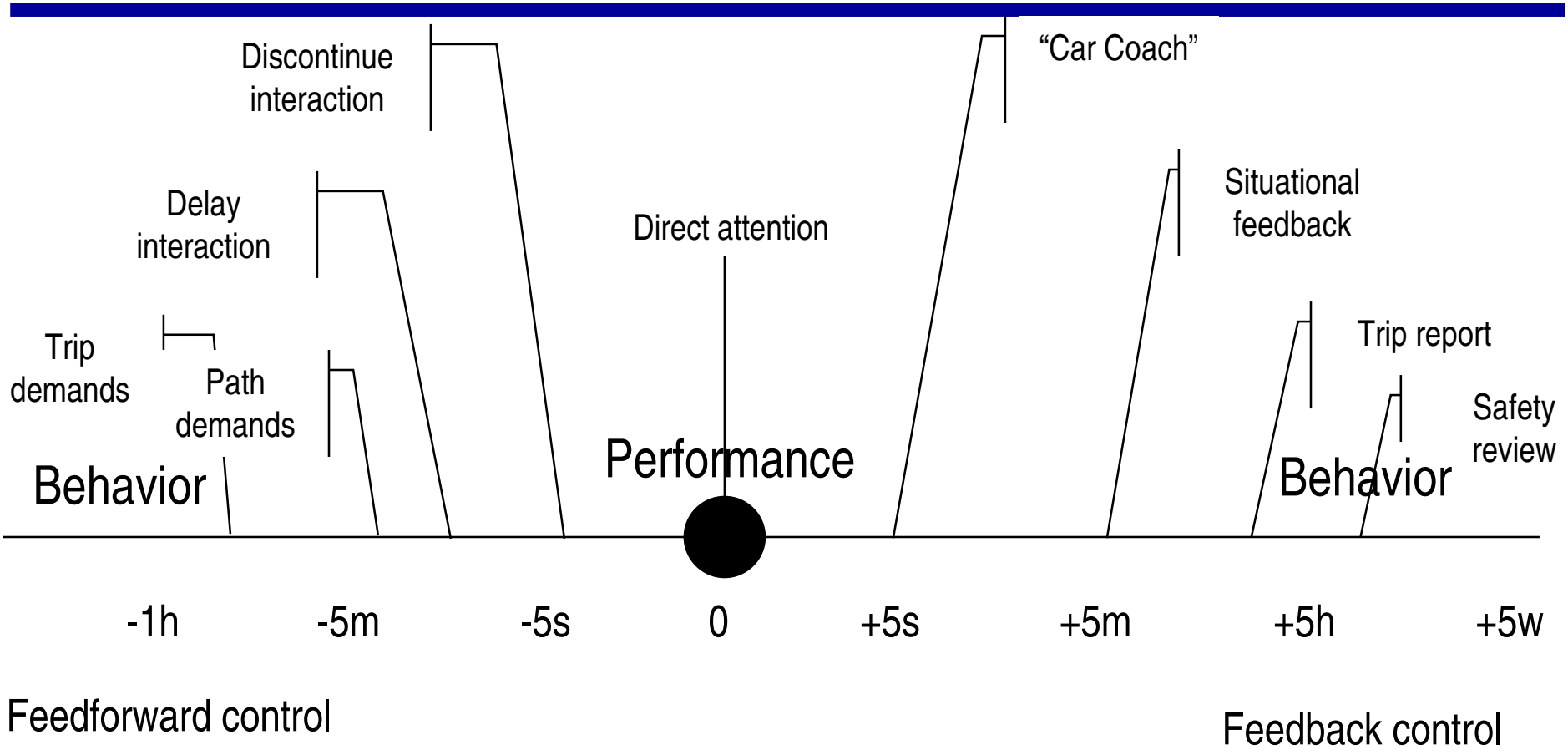
- **Social norms**

Tactical

- **Task interruption and scheduling**

Operational

- **Task conflict**


Discontinue interaction
"Car Coach"
Delay interaction
Direct attention
Situational feedback
Trip demands
Path demands
Trip report
Safety review
Behavior
Performance
Behavior
-1h
-5m
-5s
0
+5s
+5m
+5h
+5w
Feedforward control
Feedback control

Collaborators and sponsors

- NHTSA
- Delphi Automotive
- University of Michigan—UMTRI
- National Advanced Driving Simulator