User Interface Software & Technology (UIST)

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Agenda

- Past, Present, and Future of User Interface Software Tools
- Research topics and external disciplines
- History of UIST at CHI
- Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms (CHI 1997)
- Pick-and-drop: a Direct Manipulation Technique for Multiple Computer Environments (UIST 1997)

Past, Present, and Future of User Interface Software Tools

- Widespread adoption of user interfaces
- Role of input and output method
  - Keyboard and mouse
  - Monitor
- Path of least resistance
  - Easy to do the right thing
  - Difficult to do the wrong thing
- Who are user interfaces for?
  - Interactive setting
  - User attention

Core Research Topics

- Graphical and web user interfaces
- Tangible and ubiquitous computing
- Virtual and augmented reality
- Multimedia
- New input and output devices
- Human centered AI
- CSCW

External Disciplines

- Computer Science and Engineering
  - Embedded systems, wearable computing, artificial intelligence and machine learning
- Design and Media Arts
  - Interaction design, digital fabrication
- Psychology
  - Neuroscience, cognitive science
- Electrical and Mechanical Engineering
  - Robotics, material science
- Social Sciences
  - Ethics, policy, STS (Science, Technology & Society)
- Education

UIST vs. CHI Subcommittee (Building Devices)

UIST

- Focuses on technical innovation, interaction techniques, and robust systems
- Evidence that technical innovation works as intended and offers a meaningful contribution to the field of user interface
- Covers software, algorithms, and system design (unlike Building Devices)

Building Devices

- Centers on hardware, fabrication, and material innovation
- Emphasizes design, materials, and how physicality shapes use
- Covers fabrication techniques (unlike UIST)

UIST vs. CHI Subcommittee (Interacting with Devices)

UIST

- Focuses on technical innovation, interaction techniques, and robust systems.
- Evidence that technical innovation works as intended and offers a meaningful contribution to the field of user interface
- Prioritizes technical depth and system improvements (unlike Interacting with Devices).

Interacting with Devices

- Studies interaction modalities (e.g., touch, gestures, speech, haptics).
- Focuses on user engagement and behavior with emerging devices.
- Prioritizes user insights over technical innovation (unlike UIST).

UIST vs. CHI Subcommittee (Blending Interaction)

UIST

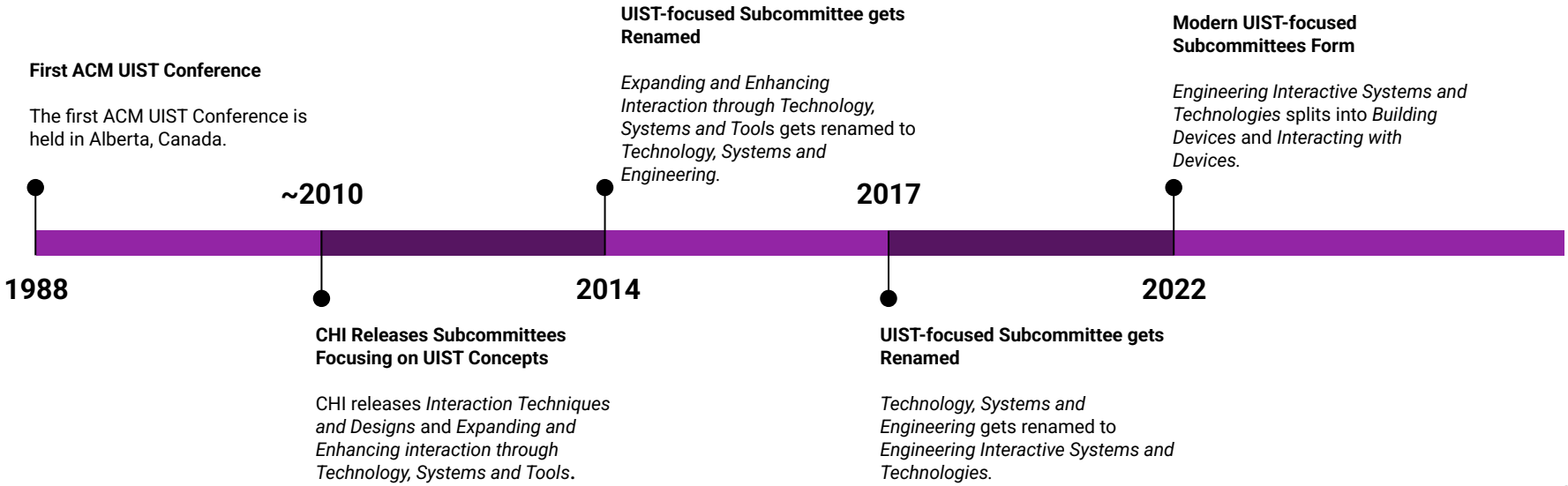
- Focuses on technical innovation, interaction techniques, and robust systems.
- Evidence that technical innovation works as intended and offers a meaningful contribution to the field of user interface.
- Includes specific technical innovations (unlike Blending Interaction).

Blending Interaction

- Integrates hardware, algorithms, human computation, and interaction techniques.
- Creates “enabling” resources for future interactive systems.
- Includes multiple technical components and enabling tools (unlike UIST).

History of UIST at CHI

UIST has never existed as a standalone subcommittee within CHI. Instead, its focus areas are represented through a combination of multiple subcommittees, primarily including *Building Devices*, *Interacting with Devices*, and *Blending Interaction*.



Tangible Bits Review

- Goal: Bridge the gap between digital (bits) and physical (atoms) worlds.
- Three Core Concepts:
  - Interactive Surfaces – Turn everyday surfaces into digital interfaces.
  - Coupling Bits & Atoms – Bind digital data to physical objects.
  - Ambient Media – Use subtle cues (light, sound, airflow) for background awareness.
- Prototype Systems:
  - metaDESK – Physical objects manipulate digital maps/data.
  - transBOARD – Smart whiteboard integrates digital & physical writing.
  - ambientROOM – Uses environmental elements to display background data.
- Inspiration: Draws from ubiquitous computing, augmented reality, graspable interfaces.
- Impact: Moves beyond screens for more intuitive, multi-sensory interaction.

Tangible Bits Subcommittee Relevance

- Tangible User Interfaces (TUIs)
  - Couple digital information with physical objects
- Interactive Surfaces
  - Transforming ordinary surfaces into dynamic interfaces
- Physical Constraints and Natural Metaphors
  - Incorporate physical constraints ground digital integration in natural familiar experiences
- Ambient Media
  - Use of ambient media (ex. light, sound, airflow, and water) in the background
- Prototyping and Iterative Design
  - Building experimental prototypes (like the metaDESK, transBOARD, and ambientROOM) to validate design concepts

Tangible Bits Subcommittee Relevance

- User-Centered and Context-Aware Research
  - Examine how people naturally interact with physical artifacts and their environments
- Multi-Modal Integration
  - Combining various sensory inputs
- Seamless Integration of Digital and Physical Worlds
  - Blend cyberspace and physical environment
- Foreground and Background Attention Dynamics
  - Conceptualizing interaction and movement between foreground and background
- Natural, Intuitive Metaphors
  - Technological metaphors drawn from everyday experience

UIST sits at the intersection of computer science, design, and human-computer interaction. What challenges may this interdisciplinary nature present?

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Nobody has responded yet.

Hang tight! Responses are coming in.

Pick-and-Drop Review

Goal: To address challenges in **multi-computer environments**, such as the "mouse jungle" and **difficult data transfers**.

Concept: A pen-based interaction that allows users to **"pick up"** digital objects from one screen and **"drop"** them on another, mimicking the act of moving a physical item.

How It Works: Uses **Pen-ID** and a **pen manager** to track objects virtually across devices, with visual feedback via object shadows.

Impact: **Enables** data transfer between devices, which **enhances** multi-device collaboration.

Pick-and-Drop Subcommittee Relevance

New Input and Output Devices:

- Introduces **Pen-ID and pen manager** technology.

Graphical and Web User Interfaces:

- Enhances feedback with visual cues like **object shadows** for data transfer status.

Tangible and Ubiquitous Computing:

- Mimics physical gestures within digital environments.
- Demonstrates **device compatibility** in multi-display settings.

CSCW (Computer-Supported Cooperative Work):

- Supports **collaborative data exchange** across multiple devices.
- Makes interactions **more intuitive** in group settings.

Do you use any devices or technologies that remind you of the Pick-and-Drop concept? If so, how do they compare in terms of usability and interaction?

Nobody has responded yet.

Hang tight! Responses are coming in.

Thank you!