A Simulation-driven Approach to User Interface Specification based on a Multiscale Visual Workspace for Supporting Collaborative Creativity
• Technical advances make HCI an **emerging** field of research

• Display technologies and input modalities **change**

• Desktop-computer paradigm disappears
  – Ubiquitous computing (Weiser, 1991)
  – Embodied interaction (Dourish, 2001)
  – Reality-based interaction (Jacob et al., 2008)
  – Natural interaction & multimodal interfaces

• **Shift** from “object-centered” to “experienced-centered” user interface development (Buxton, 2007)

→ **Rising demands** on interactive systems, **design methods and tools**
• **Interaction Design** is a recent trend in HCI that emphasizes on **designing** user experiences with technology

• Growing interest in the role and nature of **creative design** in HCI research (Stolterman, 2008)

• Efforts of integrating **design rationality** into practice
  – The Reflective Practitioner (Schön, 1983)
  – Designerly Ways of Knowing (Cross, 2007)
  – Sketching User Experiences (Buxton, 2007)

→ **Characteristics**
  – Sketching, exploring alternatives, shifting focus, process awareness, ill-defined problems, social structures (design critique), design studios...
Example: Interacting with Paper
Example: Stop-Motion Animation
interaction design practice
interaction design ecology

Buxton (2007)
problems with tools

Buxton (2007)

Microsoft Expression Blend
• Embodied practice

  - **Embodied cognition**
    “thought and action are bound up with each other”
  - Immediate feedback and visibility allows for rapid **reflection in action**
  - Accessibility of artifacts stimulates **collaboration** and review
  - Only **kindergarten-skills** required
  - Flexible means of expression stimulate **creativity**

• Computational support

  - Supports the **simulation** of dynamic behavior and interactions
  - Created design can be used for **implementation** of the final interface
  - Created artifacts are easy to **archive** on hard disks and to **share** over networks
  - Fidelity of created artifacts allows effective user studies and **evaluation measures**

How to combine the benefits of both worlds?
- Conceptual Integration Networks (Fauconnier & Turner, 1998)

A conceptual blend operates in two input mental spaces to yield a third space, the blend. Partial structure from the input spaces is projected into the blended space, which has emergent structure of its own. (Fauconnier & Turner, 2003)

- Material Anchors for Conceptual Blends (Hutchins, 2005)

- Designing with Blends (Imaz & Benyon, 2007)
• Example: metaphors and blends

“The surgeon is a butcher”

– Intended meaning is that the surgeon is incompetent

– A metaphor may not explain the incompetence, as there are expert, ordinary and incompetent butchers

– The incompetence is explained by a third space, the **blended space**
Example: The folder blend (subset of the desktop blend)
Guidelines on how to design a “good” blend (Imaz & Benyon, 2007)

• Compression
  – Relations between input spaces have to be compressed into relationships in the blend at “human scale”

• Topology
  – Relations between input spaces and within input spaces have to be analyzed to achieve a logical arrangement

• Integration
  – The aim is to achieve an integrated concept, a whole structure that is easy to memorize - unpacking the blend then becomes easier

• Relevance
  – Elements should be relevant to the purpose of the blend
three dimensions of investigation

generic spaces

Simulation
- Technical infrastructure for basic (physical) task support

Creativity
- Cognitive support for design reflection

Collaboration
- Support for social aspects of design work

New set of techniques & tool support
- design studio blend
- shared spatial workspace
- techniques for collaborative creativity
- hybrid sketching methods
shared workspace
Expected contributions

• Reference and case studies for blending theory as a foundation to the design of interactive systems

• Appreciation and support of design practice in HCI
  – Framework of blended interaction design methods

• Novel visualization and interaction techniques for interaction design studio settings