Possible iMuseum Entries and Exhibits

2018 Fundamentals of Situated Interaction
Michel Beaudouin-Lafon & Wendy E. Mackay

Please choose a topic and three papers to summarize and discuss in class.
Please analyze them in terms of instrumental interaction: what is reified, what is polymorphic, what is reusable? If not ... what could you introduce that would add this? Substrates? Co-adaptation?

1. **Marking menus and invocation:** if the user pauses, a circular menu appears. The user draws a stroke in the direction of the desired command. If the user does not pause, the menu does not appear and the user performs the gesture quickly.

   - Hinckley, K., Baudisch, P., Ramos, G., and Guimbretiere, F. Design and Analysis of Delimiters for Selection-Action pen Gesture Phrases in Scriboli. Proc. CHI, ACM (2005), 451–460.
   - Kurtenbach, G. and Buxton, W. Issues in Combining Marking and Direct Manipulation Techniques.Proc. UIST, (1991), 137–144.
   - Kurtenbach, G. and Buxton, W. User Learning and Performance With Marking Menus. Proc. CHI, ACM (1994), 258–264.

2. **Hierarchical menus:** Augmented marking menus provide access to hierarchically arranged commands.

   - Zhao, S. and Balakrishnan, R. Simple vs. Compound Mark Hierarchical Marking Menus. UIST, (2004), 33–42. + Video
   - Bailly, G., Lecolinet, E., and Nigay, L. Wave Menus: Improving the Novice Mode of Hierarchical Marking Menus. Proc. 11th IFIP TC 13 international conference on Human-computer interaction, (2007), 475–488.

3. **Menus with value control**: enable selection and control of a parameter with a single gesture.

   - McGuffin, M., Burtnyk, N., and Kurtenbach, G. FaST Sliders: Integrating Marking Menus and the Adjustment of Continuous Values. Proc. Graphics Interface, (2002), 35.
   - Guimbretière, F. and Winograd, T. FlowMenu: Combining Command, Text, and Data Entry. Proc. UIST, (2000), 213–216.
   - Pook, S., Lecolinet, E., Vaysseix, G., and Barillot, E. Control Menus: Excecution and Control in a Single Interactor. Proc. CHI EA, (2000), 263–264.

4. **Menus that follow the cursor:** stay near or under the cursor to ease invocation.

   - Fitzmaurice, G., Khan, A., Pieké, R., Buxton, B., and Kurtenbach, G. Tracking Menus. Proc. UIST, (2003), 71–79.
   - Trailing widgets: Forlines, C., Vogel, D., and Balakrishnan, R. HybridPointing: Fluid Switching Between Absolute and Relative Pointing With a Direct Input Device. Proc. UIST, (2006), 211–220.
   - Grossman, T., Hinckley, K., Baudisch, P., Agrawala, M., and Balakrishnan, R. Hover Widgets: Using the Tracking State to Extend the Capabilities of pen-Operated Devices. Proceedings of the SIGCHI conference on Human Factors in computing systems, ACM (2006), 861–870.

5. **Bubble cursor:** extends the selection scope of the cursor in order to ease the selection of targets.

   - Grossman, T. and Balakrishnan, R. The Bubble Cursor: Enhancing Target Acquisition by Dynamic Resizing of the Cursor's Activation Area. Proc. CHI, ACM (2005), 281–290.
   - Tsandilas, T. and schraefel, m. c. Bubbling Menus: a Selective Mechanism for Accessing Hierarchical Drop-Down Menus. Proc. CHI, (2007), 1195–1204.
   - Chapuis, O., Labrune, J.-B., and Petriga, E. DynaSpot: speed-dependent area cursor. Proc. CHI, ACM (2009), 1391–1400.

6. **Pointing on touch-enabled mobile devices:** makes pointing easier and more precise.

   - Roudaut, A., Huot, S., and Lecolinet, E. TapTap and MagStick: Improving one-Handed Target Acquisition on Small Touch-Screens. Proc. AVI, ACM (2008), 146–153.
   - Kim, S., Yu, J., and Lee, G. Interaction Techniques for Unreachable Objects on the

Touchscreen.Proceedings of the 24th Australian Computer-Human Interaction Conference, ACM (2012), 295–298.

7. **Bezel-based interaction:** takes advantage of the screen's bezel to trigger commands or enter specified modes.

- Roth, V. and Turner, T. Bezel Swipe: Conflict-Free Scrolling and Multiple Selection on Mobile Touch Screen Devices. Proceedings of the 27th international conference on Human factors in computing systems, (2009), 1523–1526.
- Wagner, J., Huot, S., and Mackay, W. BiTouch and BiPad: Designing Bimanual Interaction for Hand-Held Tablets. Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems, ACM (2012), 2317–2326.
- Jain, M. and Balakrishnan, R. User Learning and Performance With Bezel Menus. Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems, ACM (2012), 2221–2230.

8. **Dynamic Guides:** users pause at the beginning or the middel of a gesture or chord command to see a dynamic guide with progressive feedforward to show what options are available, and feedback to show what has already been recognized.

- Bau, O. and Mackay, W.E. OctoPocus: a dynamic guide for learning gesture-based command sets.Proc. UIST, (2008), 37–46.
- Appert, C. and Bau, O. Scale detection for a priori gesture recognition. Proc. CHI, (2010), 879–882.
- Emilien Ghomi, Stéphane Huot, Olivier Bau, Wendy E. Mackay and Michel Beaudouin-Lafon (2013) Arpège: Learning Multitouch Chord Gestures Vocabularies. In ACM International Conference on Interactive Tabletops and Surfaces. ACM, pages 209-218.
- Malloch, J., Griggio, C., McGrenere, J., and Mackay, W.E. (2017) Fieldward and Pathward: Dynamic Guides for Defining Your Own Gestures. In *Proceedings of ACM CHI 2017, Conference on Human Factors in Computing Systems*, Denver, CO. pp. 4266-4277.
- Alvina, J., Griffio, C., Bi, X., and Mackay, W.E. (2017) Command Board: Creating a General Purpose Command Gesture Input Space for Soft Keyboards. In *Proceedings of ACM UIST'17 User Interface Software and Technology*, Quebec City, Canada, pp. 17-28.

9. **Off-screen visualization:** visualize spatial location of off-screen targets.

- Gustafson, S., Baudisch, P., Gutwin, C., and Irani, P. Wedge: Clutter-Free Visualization of off-Screen Locations. Proc. CHI, ACM (2008), 787–796.
- Baudisch, P. and Rosenholtz, R. Halo: a Technique for Visualizing off-Screen Objects. Proc. CHI, ACM (2003), 481–488.
- Javed, W., Ghani, S., and Elmqvist, N. Polyzoom: Multiscale and Multifocus Exploration in 2d Visual Spaces. Proc. CHI, ACM (2012), 287–296.

10. **Drag and Drop:** facilitates moving graphical objects on the screen.

- Baudisch, P., Cutrell, E., Robbins, D., et al. Drag-and-Pop and Drag-and-Pick: Techniques for Accessing Remote Screen Content on Touch-and pen-Operated Systems. Proc. INTERACT, (2003), 57–64.
- Kobayashi, M. and Igarashi, T. Boomerang: Suspendable Drag-and-Drop Interactions Based on a Throw-and-Catch Metaphor. Proc. UIST, ACM (2007), 187–190.

11. **Scrolling:** facilitates navigating through documents.

- Igarashi, T. and Hinckley, K. Speed-Dependent Automatic Zooming for Browsing Large Documents. Proc. UIST 2000, ACM (2000), 139–148.
- Ishak, E.W. and Feiner, S.K. Content-Aware Scrolling. Proc. UIST 2006, (2006), 155–158.

12. **Beautification:** alters the feedback from cursor strokes to create smoother results.

- Fung, R., Lank, E., Terry, M., and Latulipe, C. Kinematic Templates: end-User Tools for Content-Relative Cursor Manipulations. Proc. UIST, (2008), 47–56.
- Cheema, S., Gulwani, S., and LaViola, J. Quickdraw: Improving Drawing Experience for Geometric Diagrams. Proc. CHI, ACM (2012), 1037–1064.
- St. Amant, R. and Horton, T.E. Characterizing Tool use in an Interactive Drawing

Environment.Proc. Smart Graphics, ACM (2002), 86–93.

13. **Advanced sliders:** eases navigation between or within documents

- Smith, R.B. and Taivalsaari, A. Generalized and Stationary Scrolling. Proc. UIST, ACM (1999), 1–9.
- Masui, T., Kashiwagi, K., and Borden,IV, G.R. Elastic Graphical Interfaces to Precise Data Manipulation. Conference companion on Human factors in computing systems, ACM (1995), 143–144.
- Appert, C. and Fekete, J.-D. OrthoZoom scroller: 1D multi-scale navigation. Proc. CHI, ACM (2006), 21–30.

14. **Lenses:** uses the lens metaphor to combine selection and editing of objects in a single click.

- Bier, E.A., Stone, M.C., Pier, K., Buxton, W., and DeRose, T.D. Toolglass and Magic Lenses: the see-Through Interface. Proc. Computer Graphics and Interactive Techniques, (1993), 73–80.
- Terry, M. and Mynatt, E.D. Side Views: Persistent, on-Demand Previews for Open-Ended Tasks.Proc. UIST, ACM (2002), 71–80.
- Emmanuel Pietriga, Olivier Bau and Caroline Appert (2010) Representation-Independent In-Place Magnification with Sigma Lenses. IEEE Transactions on Visualization and Computer Graphics, 16(1):455-467.
- Cyprian Pindat, Emmanuel Pietriga, Olivier Chapuis, Claude Puesch. *Drilling into Complex 3D Models with Gimlenses*, in "VRST '13: 19th ACM Symposium on Virtual Reality Software and Technology", Singapore, Singapore, ACM, October 2013, pp. 223-230.

15. **Drawing GUIs:** transforms hand-drawn strokes into prototype interactive graphical user interfaces.

- Landay, J.A. SILK: Sketching Interfaces Like Krazy. Conference companion on Human factors in computing systems: common ground, (1996), 398–399.
- Kramer, A. Translucent Patches - Dissolving Windows. Proceedings of the 7th annual ACM symposium on User interface software and technology, ACM (1994), 121–130.

16. **Dynamic Queries:** support rapid exploration of a multidimensional data space.

- Williamson, C. and Shneiderman, B. The Dynamic HomeFinder: eValuating Dynamic Queries in a Real-Estate Information Exploration System. Proc. ACM SIGIR conference on Research and development in information retrieval, ACM (1992), 338–346.
- Ahlberg, C., Williamson, C., and Shneiderman, B. Dynamic Queries for Information Exploration: an Implementation and Evaluation. Proc. CHI, ACM (1992), 619–626.
- Ahlberg, C. and Shneiderman, B. Visual Information Seeking: Tight Coupling of Dynamic Query Filters With Starfield Displays. Proc. CHI, ACM (1994), 313–317.

16. **Interaction scope:** Users select graphical objects based on their characteristics (shape, property value, etc.) or group them based on a specific rule (parenthood, common property, etc.) to for future editing (of their properties).

- Hoarau, R. and Conversy, S. Augmenting the scope of interactions with implicit and explicit graphical structures. Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems, ACM (2012), 1937–1946.
- Kurlander, D. and Bier, E.A. Graphical search and replace. SIGGRAPH Comput. Graph. 22, 4 (1988), 113–120.

18. **Zoomable (multi-scale) user interfaces:** provide a third spatial dimension to lay out documents.

- Perlin, K. and Fox, D. Pad: an Alternative Approach to the Computer Interface. Proc. Computer Graphics and Interactive Techniques, ACM (1993), 57–64.
- Bederson, B.B. and Hollan, J.D. Pad++: a Zooming Graphical Interface for Exploring Alternate Interface Physics. Proc. UIST, ACM (1994), 17–26.
- Bederson, B.B., Meyer, J., and Good, L. Jazz: an Extensible Zoomable User Interface Graphics Toolkit in Java. Proc. UIST, ACM (2000), 171–180.

19. **Alignment tools:** support alignment of graphical objects

- Raisamo, R. and Räihä, K.-J. A new Direct Manipulation Technique for Aligning Objects in Drawing Programs. Proc. UIST, ACM (1996), 157–164.

- Raisamo, R. An Alternative way of Drawing. Proc. CHI, ACM (1999), 175–182.
- Baudisch, P., Cutrell, E., Hinckley, K., and Eversole, A. Snap-and-go: Helping Users Align Objects Without the Modality of Traditional Snapping. Proc. CHI, (2005), 301–310.

20. **Window management:** use real-world metaphors to ease window management.

- Beaudouin-Lafon, M. Novel Interaction Techniques for Overlapping Windows. Proc. UIST, (2001), 153–154.
- Dragicevic, P. Combining Crossing-Based and Paper-Based Interaction Paradigms for Dragging and Dropping Between Overlapping Windows. Proc. UIST, (2004), 193–196.
- Faure, G., Chapuis, O., and Roussel, N. Power Tools for Copying and Moving: Useful for Your Desktop. Proc. CHI, ACM (2009), 1675–1678.

21. **Disambiguating target selection:** facilitates selection of small, occluded or tightly layered targets.

- Ramos, G., Robertson, G., Czerwinski, M., et al. Tumble! Splat! Helping Users Access and Manipulate Occluded Content in 2d Drawings. Proc. AVI, ACM (2006), 428–435.
- Moscovich, T. Contact Area Interaction With Sliding Widgets. Proc. UIST, (2009), 13–22.
- Yatani, K., Partridge, K., Bern, M., and Newman, M.W. Escape: a Target Selection Technique Using Visually-Cued Gestures. Proc. CHI, (2008), 285–294.

22. **Crossing techniques:** Enable fluid selection and combination of commands that point-and-click techniques do not provide.

- Apitz, G. and Guimbretière, F. CrossY: A Crossing-Based Drawing Application. Proc. UIST, ACM (2004), 3–12.
- Dixon, M., Guimbretière, F., and Chen, N. Optimal Parameters for Efficient Crossing-Based Dialog Boxes. Proc. CHI, ACM (2008), 1623–1632.

23. **Polygon detection:** detects corners from a user's input stroke.

- Agar, P. and Novins, K. Polygon Recognition in Sketch-Based Interfaces With Immediate and Continuous Feedback. Proc. Computer graphics and interactive techniques in Australasia and South East Asia, ACM (2003), 147–150.
- Wolin, A., Eoff, B., and Hammond, T. ShortStraw: A Simple and Effective Corner Finder for Polylines. Eurographics Association (2008), 33–40.
- Xiong, Y. and LaViola‚Jr., J.J. Revisiting ShortStraw: improving corner finding in sketch-based interfaces. Proc. Eurographics Symposium on Sketch-Based Interfaces and Modeling, ACM (2009), 101–108.
- Wolin, A., Paulson, B., and Hammond, T. Sort, Merge, Repeat: an Algorithm for Effectively Finding Corners in Hand-Sketched Strokes. Proc. Eurographics Symposium on Sketch-Based Interfaces and Modeling, (2009), 93–99.
- Wolin, A., Field, M., and Hammond, T. Combining corners from multiple segmenters. Proceedings of the Eighth Eurographics Symposium on Sketch-Based Interfaces and Modeling, ACM (2011), 117–124.