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Activity Report 2014

Project-Team IN-SITU

Situated interaction

IN COLLABORATION WITH: Laboratoire de recherche en informatique (LRI)

RESEARCH CENTER
Saclay - Île-de-France

THEME
Interaction and visualization

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Project-Team IN-SITU

Keywords: Augmented Reality, Interaction, Interactive Computing, Perception, Visualization

Creation of the Project-Team: 2002 July 01, end of the Project-Team: 2014 December 31.

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2. Overall Objectives

2.1. Objectives

As computers permeate every aspect of society, the number and variety of computer users has multiplied dramatically as has the quantity and complexity of the data they manage. Computers are now ubiquitous and increasingly diverse, ranging from mobile phones and PDAs to laptops, desktops and wall-sized displays. Computers and telephony have converged to create a new communication medium, providing mobile access to myriad on-line services. This revolution poses major challenges for the design, implementation and deployment of interactive systems. The current failure to address these challenges has resulted in applications that are often difficult to understand or control, lowering productivity and increasing frustration. User interfaces have not kept pace with the rapid progress in other aspects in computing: The desktop metaphor that has driven personal computing for the past 25 years has reached its limits, with no short-term alternative.

The time has come for a new generation of interactive systems. The focus of the InSitu project is to create innovative interactive systems that truly meet the needs of their users. For us, context is critical: we need to provide designers with tools and methods that actively take context into account. This requires a deeper understanding of the complementary characteristics of humans and computers as well as an analysis of specific situations of use. Our goal is to develop and facilitate the creation of such situated interfaces, which take optimal advantage of context to provide users with the particular tools they need to address the problems at hand. Our approach both expands today's graphical user interfaces and explores new possibilities, addressing the following goals:

- *Flexibility* to support end-user customisation and programming as well as adaptation to physical context;
- *Integration of physical and electronic worlds* through the exploration of mixed reality and tangible interfaces;
- *Scalability* with respect to the quantity of data being managed, through the development of multi-scale interfaces and information visualisation techniques;
- *Cooperation and collaboration support* in order to study new forms of person-to-person mediated communication;
- *Integration* of varied interaction styles and techniques into a single coherent environment, using appropriate interaction models and architectures.

The overall goal of InSitu is to develop situated interfaces, i.e. interfaces that are adapted (or adaptable) to their contexts of use by taking advantage of complementary aspects of humans and computers. Our very ambitious longterm goal is to move beyond the current generation of desktop environments and envision the next generation of interactive environments. The specific objective for the next four years is to create one or more prototype interactive environments that begin to explore what this next generation of interactive systems might look like.

Our research strategy is to develop case studies and development tools, in parallel. The case studies allow us to study specific users, in particular application domains, and explore innovative interaction approaches in real-world contexts. The development tools, consisting of architectures and toolkits, allow us to create a development environment for creating novel types of interaction and facilitate the creation of innovative applications. We have identified four research themes, each with separate deliverables, to achieve this objective: Interaction and Visualization Paradigms, Mediated Communication, Research Methods and Engineering of Interactive Systems.

2.2. Research Themes

InSitu addresses three major research themes:

Interaction and visualization paradigms focuses on the trade-off between power and simplicity in interactive systems, both in terms of interaction and in managing and visualizing data. Rather than accepting one or the other, our objective is to shift the trade-off curve, creating systems that provide more power while retaining simplicity. We are currently investigating multi-surface interaction, interactive information visualization, gesture-based interaction, multimedia (video and audio) and tangible interfaces. Our goal is to not only explore these paradigms individually but also to investigate how to integrate them into real-world applications.

Research methods focuses on how multi-disciplinary teams can create effective interactive systems that take context into account. Our objective is to create new research methods that include users throughout the design process, to test these methods in real-world settings and to disseminate these methods to researchers and designers. We are currently investigating participatory design techniques that actively involve users throughout the design process and multidisciplinary design techniques that facilitate communication among researchers from engineering, social science and design disciplines.

Engineering of interactive systems focuses on creating effective tools for building interactive systems. Our objective is to generate libraries, exploratory toolkits and platforms that enable us to quickly implement and work with new concepts, while also enabling researchers within and outside of InSitu to benefit from our research. We are currently investigating tools that facilitate the design and adoption of effective interaction techniques and paradigms and component-based architectures to facilitate dynamic management of distributed interactive systems. Our goal is to develop open source toolkits that enable us and our research colleagues to design and implement advanced interactive systems.

Although we articulate each theme separately, we often intermix them within actual projects. We also work across disciplines, providing us with research breadth, and at the same time, seek to obtain depth in particular projects. We apply our own research methods to the design of new interaction techniques, develop our own tools for developing these techniques and integrate these techniques in the design of innovative interactive systems, which we test in real-world settings. Our long-term goal is to create a new generation of interactive environments that provide a compelling alternative to the current generation of desktop computers.

3. Research Program

3.1. Multi-disciplinary Research

InSitu uses a multi-disciplinary research approach, including computer scientists, psychologists and designers. Working together requires an understanding of each other's methods. Much of computer science relies on formal theory, which, like mathematics, is evaluated with respect to its internal consistency. The social sciences are based more on descriptive theory, attempting to explain observed behaviour, without necessarily being able to predict it. The natural sciences seek predictive theory, using quantitative laws and models to not only explain, but also to anticipate and control naturally occurring phenomena. Finally, design is based on a corpus of accumulated knowledge, which is captured in design practice rather than scientific facts but is nevertheless very effective.

Combining these approaches is a major challenge. We are exploring an integrative approach that we call *generative theory*, which builds upon existing knowledge in order to create new categories of artefacts and explore their characteristics. Our goal is to produce prototypes, research methods and software tools that facilitate the design, development and evaluation of interactive systems [34].

4. Application Domains

4.1. Application Domains

InSitu works on general problems of interaction in multi-surface environments as well as on challenges associated with specific research groups. The former requires a combination of controlled experiments and field studies; the latter involves participatory design with users. We are currently working with highly creative people, particularly designers and music composers, to explore interaction techniques and technologies that support the earliest phases of the design process. We are also working with research scientists, particularly neuroscientists and astrophysicists, in our explorations of interaction in multisurface environments, and with doctors and nurses to support crisis management situations.

5. New Software and Platforms

5.1. WILDER Platform

Participants: Michel Beaudouin-Lafon [correspondant], Olivier Chapuis, Cédric Fleury, Olivier Gladin, Rémi Hellequin, Stéphane Huot, Amani Kooli, Monireh Sanaei, Gabriel Tezier, Jonathan Thorpe.

WILDER is InSitu's second experimental ultra-high-resolution interactive environment, following up on the WILD platform developed since 2009 [2] (Figure 1). It features a wall-sized display with seventy-five 20" LCD screens, i.e. a 5m50 x 1m80 (18' x 6') wall displaying $14\,400 \times 4\,800 = 69$ million pixels, powered by a 10-computer cluster and two front-end computers. The platform also features a camera-based motion tracking system supporting interaction with the wall as well as within the surrounding space, a multitouch frame making the entire wall-sized display touch sensitive and various mobile devices. WILDER is part of the DIGISCOPE Equipment of Excellence and, in combination with WILD and the other DIGISCOPE rooms, provides a unique experimental environment for collaborative interaction. In addition to using WILD and WILDER for our research, we have also developed software architectures and toolkits that enable developers to run applications on such multi-device, cluster-based systems.

5.2. Smarties

Participants: Olivier Chapuis [correspondant], Anastasia Bezerianos, Bruno Fruchard.

The Smarties system [16] provides an easy way to add mobile interactive support to collaborative applications for wall displays.

It consists of (i) a mobile interface that runs on mobile devices for input, (ii) a communication protocol between the mobiles and the wall application, and (iii) libraries that implement the protocol and handle synchronization, locking and input conflicts. The library presents the input as an event loop with callback functions and handles all communication between mobiles and wall application. Developers can customize the mobile interface from the wall application without modifying the mobile interface code.

On each mobile we find a set of cursor controllers associated with keyboards, widgets and clipboards. These controllers (pucks) can be shared by multiple collaborating users. They can control simple cursors on the wall application, or specific content (objects or groups of them). The developer can decide the types of widgets associated to pucks from the wall application side.

Smarties mobile clients currently run on Android, while server libraries have been developed in C++ and Java.

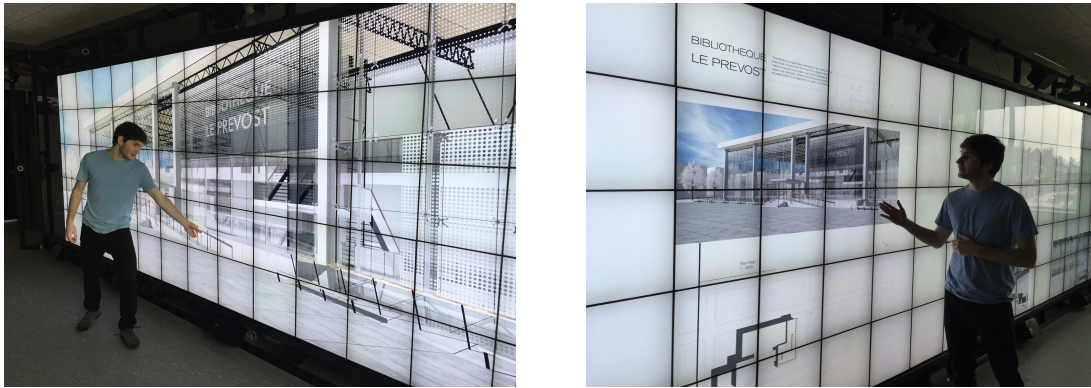


Figure 1. The WILDER platform.



Figure 2. Left: Multiple Lenses, starting from the left a magnification lens, a DragMag and a fisheye. Right: two synchronized Smarties clients running on tablets. The four colored pucks are attached respectively to a magnification lens (left of wall), the anchor and lens of a DragMag (middle) and a fisheye (right). The active puck is the blue for the device on top, and green for the bottom. The described widgets added by the application are seen on the widget area.

Smarties is available at the <http://smarties.lri.fr/> under a GNU GPL licence.

- ACM: H.5.2 [User Interfaces]: Graphical user interfaces (GUI)
- Software benefit: See O. Chapuis, A. Bezerianos, S. Franzeskakis (2014) Smarties: An Input System for Wall Display Development. In CHI '14: Proceedings of the 32nd international conference on Human factors in computing systems. ACM, pages 225-234.
- OS/Middleware: Crossplatform
- Required library or software: none
- Programming language: C++, Java

5.3. WildOS

Participant: Michel Beaudouin-Lafon [correspondant].

WildOS is middleware to support applications running in an interactive room featuring various interaction resources, such as our WILD and WILDER rooms: a tiled wall display, a motion tracking system, tablets and smartphones, etc. The conceptual model of *WildOS* is a *platform*, such as the WILD or WILDER room, described as a set of devices and on which one or more applications can be run.

WildOS consists of a server running on a machine that has network access to all the machines involved in the platform, and a set of clients running on the various interaction resources, such as a display cluster or a tablet. Once *WildOS* is running, applications can be started and stopped and devices can be added to / removed from the platform.

WildOS relies on Web technologies, most notably Javascript and node.js, as well as node-webkit and HTML5. This makes it inherently portable (it is currently tested on Mac OS X and Linux). While applications can be developed only with these Web technologies, it is also possible to bridge to existing applications developed in other environments if they provide sufficient access to be remote controlled.

WildOS is used in several InSitu projects, and is also deployed on several of Google's interactive rooms in Mountain View, Dublin and Paris. It is available under on Open Source licence at <https://bitbucket.org/mblinsitu/wildos>.

- ACM: H.5.2 [User Interfaces]: Graphical user interfaces (GUI)
- Software benefit: helps the development of multisurface applications.
- OS/Middleware: Crossplatform
- Required library or software: node.js, node-webkit
- Programming language: Javascript

5.4. GlideCursor

Participants: Michel Beaudouin-Lafon [correspondant], Stéphane Huot.

GlideCursor is a Mac OS X application that implements the inertial cursor described in [15]. The current version only works when moving the cursor with a trackpad. The application lets users configure gliding, and can also log cursor activity for later analyses.

GlideCursor is available under on Open Source licence at <https://bitbucket.org>.

- ACM: H.5.2 [User Interfaces]: Graphical user interfaces (GUI)
- Software benefit: can improve cursor pointing on large displays.
- OS/Middleware: Mac OS X
- Required library or software: none
- Programming language: Objective-C

6. New Results

6.1. Highlights of the Year

Wendy Mackay received the *ACM SIGCHI Lifetime Service Award*.

BEST PAPER AWARD :

[22] **Effects of Display Size and Navigation Type on a Classification Task in CHI '14**. C. LIU, O. CHAPUIS, M. BEAUDOUIN-LAFON, É. LECOLINET, W. E. MACKAY.

6.2. Interaction Techniques

Participants: Caroline Appert, Michel Beaudouin-Lafon, Anastasia Bezerianos, David Bonnet, Olivier Chapuis [correspondant], Cédric Fleury, Stéphane Huot, Can Liu, Justin Mathew, Wendy Mackay, Halla Olafsdottir, Theophanis Tsandilas, Oleksandr Zinenko.

InSitu explores interaction and visualization techniques in a variety of contexts, including individual interaction techniques on different display surfaces that range from mobile devices to very large wall-sized displays, including standard desktop systems and tabletops.

This year, we investigated multi-touch gestures on tabletop [26], we considered the combination of Tilt and Touch on smartphone [29], we proposed novel bi-manual interaction techniques for tablets [18], we introduced a novel focus+context technique to facilitate route following [14], we introduced the *GlideCursor* to facilitate pointing on large display [15], we compared physical navigation in front of a wall-size display with virtual navigation on the desktop [22], we studied users' behavior in immersive Virtual Environments [12], we built a tool to ease the extraction and the expression of parallelism in programs [30] and we investigated the effect of contours on star glyphs [13].

In addition to providing knowledge for designers and practitioners, this set of remarkable results advances our overall knowledge regarding basic interactive phenomena, and allows to better understand how user practices will change.

Multitouch on Tabletop – We systematically studied how users adapt their grasp when asked to translate and rotate virtual objects on a multitouch tabletop [26]. We have shown that users choose a grip orientation that is influenced by three factors: (1) a preferred orientation defined by the start object position, (2) a preferred orientation defined by the target object position, and (3) the anticipated object rotation. We have examined these results in the light of the most recent models of planning for manipulating physical objects and explored how these results can inform the design of tabletop applications.

Tilt & Touch – We studied the combination of tilt and touch when interacting with mobile devices [29]. We conducted an experiment to explore the effectiveness of *TiltTouch* gestures for both one-handed and two-handed use. Our results indicate the best combinations of *TiltTouch* gestures in terms of performance, motor coordination, and user preferences.

SPad – We created *SPad* [18], a new bimanual interaction technique designed to improve productivity on multi-touch tablets: the user activates quasimodes with the thumb of the non-dominant hand while holding the device with that hand and interacts with the content with the dominant hand (figure 3). We conducted an iterative design process and created a tablet application that demonstrates how *SPad* enables faster, more direct and more powerful interaction without increasing complexity.

RouteLenses – Millions of people go to the Web to search for geographical itineraries. Inspecting those map itineraries remains tedious because they seldom fit on screen, requiring much panning & zooming to see details. Focus+context techniques address this problem by displaying routes at a scale that allows them to fully fit on screen: users see the entire route at once, and perform magnified steering using a lens to navigate along the path, revealing additional detail. We created *RouteLenses* [14], a type of lenses that automatically adjusts their position based on the geometry of the path that users steer through (figure 4). *RouteLenses* make it easier for users to follow a route, yet do not constrain movements too strictly, leaving them free to move the lens away from the path to explore its surroundings.

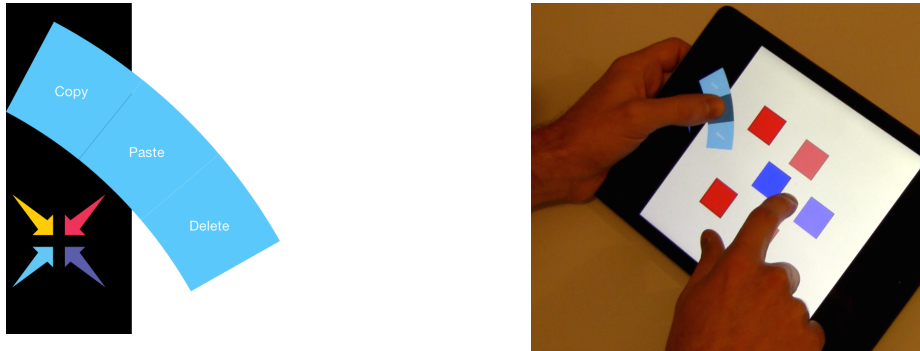


Figure 3. Left: SPad control accessible with the thumb. Three commands are accessible with a tap of the thumb, 4 menus are accessible with swipes. Right: SPad in use to paste and move objects that have just been copied.

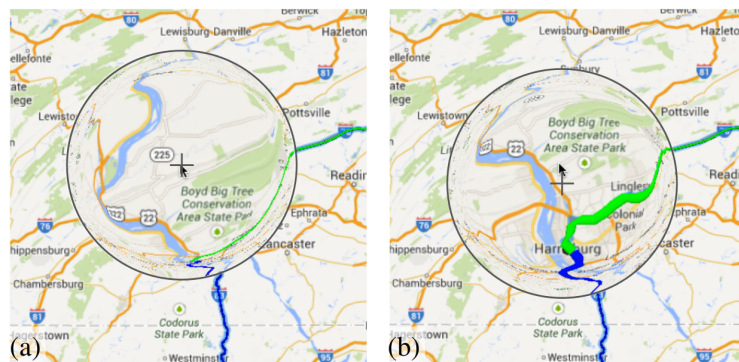


Figure 4. Following an itinerary. (a) Conventional lens: the user overshoots at a right turn in Harrisburg; losing the route that falls in the distorted region. (b) RouteLens: the route's attraction compensates the overshoot; the lens remains closer to the route, which remains in focus.

GlideCursor – Pointing on large displays with an indirect, relative pointing device such as a touchpad often requires clutching. We designed and evaluated *GlideCursor* [15], which lets the cursor continue to move during clutching gestures. The effect is that of controlling the cursor as a detached object that can be pushed, with inertia and friction similar to a puck being pushed on a table. We analyzed gliding from a practical and a theoretical perspective and conducted two studies. The first controlled experiment established that gliding reduces clutching and can improve pointing performance for large distances. We introduced a measure called *cursor efficiency* to capture the effects of gliding on clutching. The second experiment demonstrated that participants use gliding even when an efficient acceleration function lets them perform the task without it, without degrading performance.

Wall vs. Desktop – The advent of ultra-high resolution wall-size displays and their use for complex tasks require a more systematic analysis and deeper understanding of their advantages and drawbacks compared with desktop monitors. While previous work has mostly addressed search, visualization and sense-making tasks, we have designed and evaluated an abstract classification task that involves explicit data manipulation [22]. Based on our observations of real uses of a wall display (figure 5-left), this task represents a large category of applications. We conducted a controlled experiment that uses this task to compare physical navigation in front of a wall-size display (figure 5-right) with virtual navigation using pan-and-zoom on the desktop. Our main finding is a robust interaction effect between display type and task difficulty: while the desktop can be faster than the wall for simple tasks, the wall gains a sizable advantage as the task becomes more difficult.

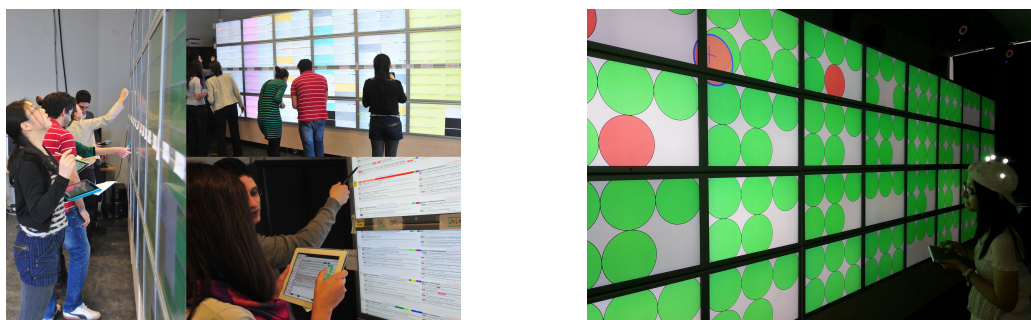


Figure 5. Left: Fine tuning the CHI 2013 conference schedule on the WILD display. Center: Classification task inspired by the CHI scheduling task conducted on the wall-sized display. Subjects must move misclassified red disks into containers (represented by the individual screens) of the same class. The class is represented by a very small letter at the center of each disk, forcing subjects to physically move in front of the display.

Immersive VE – The feeling of presence is essential for efficient interaction within Virtual Environments (VEs). When a user is fully immersed within a VE through a large immersive display system, her feeling of presence can be altered because of disturbing interactions with her physical environment. This alteration can be avoided by taking into account the physical features of the user as well as those of the system hardware. Moreover, the 3D abstract representation of these physical features can also be useful for collaboration between distant users. In [12] we presented how we use the Immersive Interactive Virtual Cabin (IIVC) model to obtain this virtual representation of the user’s physical environment and we illustrated how this representation can be used in a collaborative navigation task in a VE. We also presented how we can add 3D representations of 2D interaction tools in order to cope with asymmetrical collaborative configurations, providing 3D cues for a user to understand the actions of others even if he/she is not fully immersed in the shared VE.

Clint – We created *Clint*, a direct manipulation tool to ease the extraction and the expression of parallelism in existing programs [30]. Clint is built on top of state-of-the-art compilation tools (polyhedral representation of programs) in order to give a visual representation of the code, perform automatic data dependence analysis and

to ensure the correctness of code transformations (figure 6). It can be used to rework and improve automatically generated optimizations and to make manual program transformation faster, safer and more efficient.

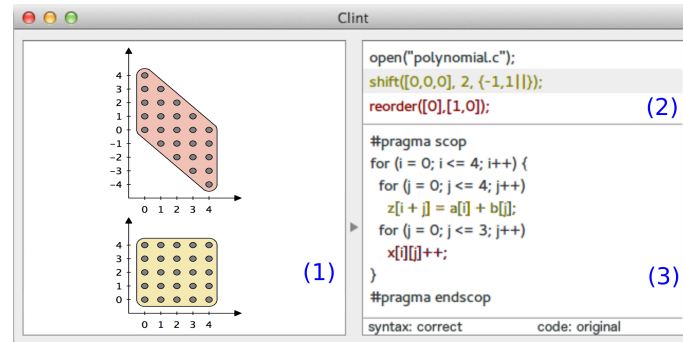


Figure 6. Clint interface includes: (1) interactive visualization, (2) editable history view, and (3) source code editor.

Start Glyphs – We conducted three studies using crowd-sourcing on Amazon mechanical Turk, to determine the effect of using contours on data glyphs such as star glyphs [13]. Our results indicate that glyphs without contours lead viewers to naturally make judgements that are data-driven. Whereas adding contours encourages shape similarity, e.g. perceiving rotated variations of glyphs as similar (even though they are not similar in data space).

6.3. Research Methods

Participants: Michel Beaudouin-Lafon, Anastasia Bezerianos, Jérémie Garcia, Stéphane Huot, Ilaria Liccardi, Wendy Mackay [correspondant], Justin Mathew.

Conducting empirical research is a fundamental part of InSitu’s research activities, including observation of users in field and laboratory settings to discover problems faced by users, controlled laboratory experiments to evaluate the effectiveness of the technologies we develop, longitudinal field studies to determine how our technologies work in the real world, and participatory design, to explore design possibilities with users throughout the design process.

Computer-aided Composition – We designed *Polyphony* [20], a novel interface for systematically studying all phases of computer-aided composition, and then used it to observe expert creative behavior. *Polyphony* is a unified user interface that integrates interactive paper and electronic user interfaces for composing music. We asked 12 composers to use it (figure 7-left) to compose an electronic accompaniment to a 20-second instrumental composition by Anton Webern. The resulting dozen comparable snapshots of the composition process reveal how composers both adapt and appropriate tools in their own way. In collaboration with IRCAM, we also conducted a longitudinal study where we closely collaborated with composer Philippe Leroux [19] in the creation of his piece *Quid sit musicus*. The composer used our interfaces based on interactive paper along with an OpenMusic library to generate compositional material for this work (figure 7-right).

Multitouch Gestures – We created a design space of simple multitouch gestures that designers of user interfaces can systematically explore to propose more gestures to users [27]. We further considered a set of 32 gestures for tablet-sized devices, by developing an incremental recognition engine that works with current hardware technology, and empirically testing the usability of those gestures. In our experiment, individual gestures were recognized with an average accuracy of $\sim 90\%$, and users successfully achieved some of the transitions between gestures without the use of explicit delimiters. The goal of this work is to assist designers in optimizing the use of the rich multi-touch input channel for the activation of discrete and continuous controls,

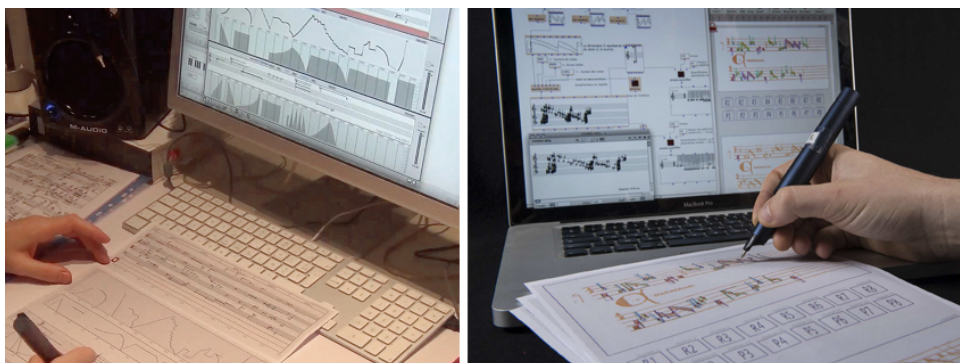


Figure 7. Left: A composer completes the composition task using Polyphony. Right: Set of tools created for Philippe Leroux' piece *Quid sit musicus*. Photo by H. Raguet, Inria.

and to enable fluid transitions between controls, e.g. when selecting text over multiple views, manipulating different degrees of freedom of a graphical object or invoking a command and setting its parameter values in a row.

Spatial Audio – We investigated the issues of spatialization techniques for object-based audio production and introduced the Spatial Audio Design Spaces framework (SpADS) [25], which describes the spatial manipulation of object-based audio. These design spaces are based on interviews with professional sound engineers and on a morphological analysis of 3D audio objects that clarifies the relationships between recording and rendering techniques that define for 3D speaker configurations. This will allow us to analyze and design novel advanced object-based controllers.

Physical Visualizations – We studied the design process of physical visualizations. An increasing variety of such visualizations are being built, for purposes ranging from art and entertainment to business analytics and scientific research. However, crafting them remains a laborious process and demands expertise in both data visualization and digital fabrication. We analyzed the limitations of current workflows through three real case studies and created *MakerVis*, the first tool that integrates the entire workflow, from data filtering to physical fabrication (figure 8). Design sessions with three end users showed that tools such as *MakerVis* can dramatically lower the barriers behind producing physical visualizations. Observations and interviews also revealed important directions for future research. These include rich support for customization, and extensive software support for materials that accounts for their unique physical properties as well as their limited supply.

6.4. Engineering of interactive systems

Participants: Caroline Appert, Michel Beaudouin-Lafon [correspondant], Olivier Chapuis, Cédric Fleury, Stéphane Huot, Theophanis Tsandilas, Wendy Mackay.

InSitu has a long tradition of developing software tools and user interface toolkits to facilitate the creation of interactive systems. These tools allow us to better experiment with our ideas and are therefore an integral part of our research methodology. Most of them are freely available and some are used outside InSitu for research or teaching.

Interactive Paper – We created *PaperComposer* [31], a graphical interface builder for creating personal interactive-paper applications for musical creation. We also built an API that facilitates the development of interactive paper components for *PaperComposer*. The API enables developers to define new paper components that accept additional musical data with their own representation structures and interactions.

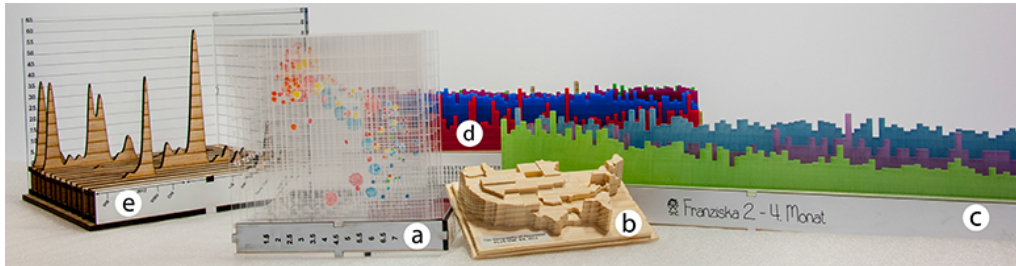


Figure 8. Physical visualizations created with MakerVis: a) a scatterplot created after Hans Rosling’s TED talk, b) a prism map showing happiness across the US computed from Twitter sentiments, c),d),e) visualizations created by users during design sessions.

3D Telepresence – In the context of 3D telepresence, we studied how to transmit a 3D model of the users to a remote location. In [17] we present a 3D head reconstruction method for low cost 3D telepresence systems that uses only a single consumer level hybrid sensor (color+depth) located in front of the users. Our method fuses the real-time, noisy and incomplete output of a hybrid sensor with a set of static, high-resolution textured models acquired in a calibration phase (figure 9). A complete and fully textured 3D model of the users’ head can thus be reconstructed in real-time, accurately preserving the facial expression of the user. The main features of our method are a mesh interpolation and a fusion of a static and a dynamic textures to combine respectively a better resolution and the dynamic features of the face.

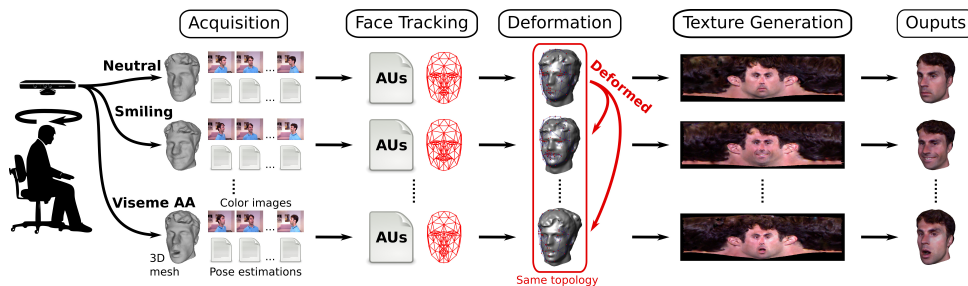


Figure 9. Acquisition step of the 3D face reconstruction: data are processed to create a complete and fully textured 3D head model for each facial expression. This set of head models are then used to improve the real-time reconstruction of the user’s head during a 3D telepresence session.

Wall-sized displays – We developed Smarties [16], a system that allows developers to easily add interactive support to their wall-sized display applications by using mobile devices such as tablets. The system includes an original mobile interface that can be customized by the application itself (without programming the mobile device), a communication protocol between the mobile devices and the application running on the wall-sized display, and libraries in different programming languages that implement the protocol and handle synchronization, locking and input conflicts. Synchronization between multiple mobile devices is handled by the libraries, and thus the system supports free collaboration. The mobile devices come with multiple cursor controllers, also associated with keyboards, widgets and clipboards.

7. Partnerships and Cooperations

7.1. Regional Initiatives

DigiPods - Remote Collaborative Interaction among Heterogeneous Visualization Platforms, Région Île-de-France (2012-2015), Coordinator: Stéphane Huot. Partners: Digiteo/FCS Campus Paris-Saclay, Univ. Paris-Sud, Inria, CNRS, CEA, Telecom ParisTech.

The goal of DIGIPODS is to design new interactive equipments and devices for collaborative interaction in immersive and high-resolution visualization platforms, connected through a high-end telepresence infrastructure. Beyond the usual interactive devices of such platforms (motion capture, interactive surfaces, haptic devices, audio and video systems), all the platforms will be augmented with new devices to facilitate co-located or remote interaction and collaboration: telepresence robots and the DigiCarts, a new kind of interaction devices specifically designed for these needs. These equipments will be used by researchers in Human-Computer Interaction to explore the visualization and manipulation of large datasets, interaction in virtual reality, remote collaboration among heterogeneous platforms; but also by researchers from other fields and by professionals in order to explore and manipulate their complex data.

DigiCarts - Post-doctoral fellow position funded by Digiteo, Coordinator: Stéphane Huot. Partners: Univ. Paris-Sud, Inria, CNRS, CEA, Telecom ParisTech.

Complements the DigiPods project with funding for a 18 months post-doctoral position focused on the design, implementation and evaluation of the DigiCart devices.

DigiZoom - Funding by DIGICOSME Labex, Coordinator: Olivier Chapuis. Partners: U. Paris-Sud, Inria, Institut Mines-Telecom.

Design, modeling and empirical evaluation of multi-scale navigation techniques depending on the input channels and output characteristics of the devices, in particular their size, in single-user and collaborative contexts. This project funds a joint PhD student between InSitu and the VIA group at Institut Mines-Telecom.

MultiVis - Funding by DIGICOSME Labex, Coordinator: James Eagan (Institut Mines Telecom). Partners: U. Paris-Sud, Inria, Institut Mines-Telecom.

Design, evaluate, and implement novel interaction models to help users appropriate multiple computational surfaces in the sense-making process. Our initial approach is to operationalize and extend the instrumental interaction model to specifically accommodate the specific needs of the sense-making process for information visualization. This project funds a joint PhD student between the VIA group at Institut Mines-Telecom and InSitu.

7.2. National Initiatives

Digiscope - Collaborative Interaction with Complex Data and Computation (2011-2020) <http://digiscope.fr>. “Equipment of Excellence” project funded by the “Investissements d’Avenir” program of the French government. 10 academic partners: FCS Paris-Saclay (coordinator), Université Paris-Sud, CNRS, CEA, Inria, Institut Telecom ParisTech, Ecole Centrale Paris, Université Versailles - Saint-Quentin, ENS Cachan, Maison de la Simulation. Overall budget: 22.5 Meuros, including 6.7 Meuros public funding from ANR. Michel Beaudouin-Lafon: coordinator and principal investigator for the whole project.

The goal of Digiscope is to create nine high-end interactive rooms interconnected by high-speed networks and audio-video facilities to study remote collaboration across interactive visualization environments. The equipment will be open to outside users and targets four main application areas: scientific discovery, product lifetime management, decision support for crisis management, and education and training. In Situ contributes the existing WILD room, a second room called WILDER funded by the project, and its expertise in the design and evaluation of advanced interaction techniques and the development of distributed software architectures for interactive systems.

MDGest - Interacting with Multi-Dimensional Gestures (2011-2014). InSitu is the only academic partner. Funded by the French National Research Agency (ANR), Programme JCJC (Junior researchers): 88 Keuros. Caroline Appert (coordinator) and Theophanis Tsandilas.

This project investigates new interactions for small devices equipped with a touchscreen. Complementing the standard point-and-click interaction paradigm, the MDGest project explores an alternative way of interacting with a user interface: tracing gestures with the finger. According to previous work, this form of interaction has several benefits, as it is faster and more natural for certain contexts of use. The originality of the approach lies in considering new gesture characteristics (dimensions) to avoid complex shapes that can be hard for users to memorize and activate. Dimensions of interest include drawing speed (local or global), movement direction, device orientation or inclination, and distinctive drawing patterns in a movement.

DRAO – Adrien Bousseau (Inria, Sophia Antipolis) submitted a successful ANR grant with InSitu members Theophanis Tsandilas and Wendy Mackay, and Prof. Maneesh Agrawala (Berkeley).

The goal of the project is to create interactive graphics tools to support sketching. The kickoff meeting was held in Nov. 2012 and included interviews with designers from Toyota.

7.3. European Initiatives

7.3.1. CREATIV

Type: IDEAS

Instrument: ERC Advanced Grant

Duration: June 2013 - May 2018

Coordinator: Wendy Mackay

Partner: Inria (France)

Inria contact: Wendy Mackay

Abstract: CREATIV explores how the concept of co-adaptation can revolutionize the design and use of interactive software. Co-adaptation is the parallel phenomenon in which users both adapt their behavior to the system's constraints, learning its power and idiosyncrasies, and appropriate the system for their own needs, often using it in ways unintended by the system designer. The initial goal of the CREATIV project is to fundamentally improve the learning and expressive capabilities of advanced users of creative software, offering significantly enhanced methods for expressing and exploring their ideas. The ultimate goal is to radically transform interactive systems for everyone by creating a powerful and flexible partnership between human users and interactive technology.

7.3.2. Social Privacy

Type: PEOPLE

Instrument: Marie Curie International Outgoing Fellowships for Career Development

Duration: September 2012 - August 2015

Coordinator: Wendy Mackay

Partner: Inria (France) and Massachusetts Institute of Technology (USA)

Inria contact: Ilaria Liccardi

Abstract: Although users' right to privacy has long been protected, the rapid adoption of social media has surpassed society's ability to effectively regulate it. Today's users lack informed consent: they must make all-or-nothing decisions about on-line privacy regardless of context. The Social Privacy project will first diagnose the problem, exploring privacy issues associated with social media at the level of the individual, the enterprise and society, and then generate effective solutions, from providing users with technical safeguards and informed consent, to establishing corporate guidelines for protecting privacy, to developing and testing recommendations for public policy.

7.3.3. Collaborations in European Programs, except FP7 & H2020

EIT ICT Labs Master School, European Institute of Technology. Coordinator: M. Beaudouin-Lafon. Partners: KTH (Sweden), U. Paris-Sud (France), U. Aalto (Finland), Technical University Berlin (Germany), Technical University Delft (Netherlands), U. College London (UK), U. Trento (Italy).

InSitu participates in the Human-Computer Interaction and Design (HCID) major of the EIT ICT Labs European Master School. Paris-Sud is one of the sites for the first year of this Master Program, and hosts one of the specialties for second-year students. Students in this program receive a double degree after studying in two countries. https://www.dep-informatique.u-psud.fr/en/formation/lmd/M1_HCID.

7.3.4. Collaborations with Major European Organizations

VCoRE - Next-Generation Visual Computing Platform (ADT Inria, 2011-2014), Coordinator for InSitu: Stéphane Huot. Partners: Inria (Grenoble, Lille, Rennes, Saclay, Sophia Antipolis), IGD Fraunhofer Institute.

Collaboration between Inria and IGD Fraunhofer Institute for the specification and development of a software framework dedicated to mixed/augmented/virtual reality and advanced visualization platforms (distributed computer graphics, simulation and interaction).

7.4. International Initiatives

7.4.1. Inria International Labs

7.4.1.1. Massive Data

A former member of InSitu, Emmanuel Pietriga, has spent two years at the Inria Chile/CIRIC lab as head of the Massive Data team. The team focuses on the design, development and empirical evaluation of novel interactive visualization techniques that help users understand and manipulate massive amounts of data on different types of platforms: mobile devices, workstations, control rooms (ALMA radio-telescope), ultra-high-resolution wall-sized displays such as ANDES, the lab's wall-sized display similar to InSitu's WILD and WILDER rooms. During his stay, he continued to collaborate with InSitu members.

- ALMA: <http://almaobservatory.org>
- ANDES: http://www.inria.cl/?page_id=2727&lang=en

7.4.2. Inria Associate Teams

7.4.2.1. MIDWAY

Title: Musical Interaction Design Workbench And technology

International Partner:

McGill University & CIRMMT, Montréal (CA), Marcelo Wanderley

Duration: 2014 -

See also: <http://insitu.lri.fr/MIDWAY>

The MIDWAY associated team involves two partners: the InSitu group, and the Input Devices and Music Interaction Laboratory (IDMIL) from the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT) – McGill University. Our goal is to design and implement MIDWAY, a musical interaction design workbench, to facilitate the exploration and design of new interactive technologies for both musical creation and performance. Each laboratory has extensive experience developing new interactive technologies and studying interactive phenomena from complementary points of view. The two groups share multiple, complementary research interests that the MIDWAY joint team will help them to explore together: InSitu's experience working with composers to develop novel tools, toolkits and interaction models will complement IDMIL/CIRMMT's knowledge and experience designing new musical instruments and their studies of the musical creative process. Both partners have organized workshops to initiate and to plan the research program for the upcoming months (joint developments, publication and visits/exchanges).

7.4.3. Inria International Partners

7.4.3.1. Informal International Partners

- Stu Card and Sara Goldhaber-Fiebert, Stanford University, on improving the use of emergency manuals in operating rooms.

- Wendy Ju, Stanford University, and Steven Dow, Carnegie Mellon University, on the issues of Research Through Design.
- James Hollan, U.C. San Diego, on video analysis tools.
- Bjorn Hartmann, U.C. Berkeley, on multi-surface interaction.
- Shumin Zhai, Google Mountain View, on gesture-based interaction.
- Clemens Klokrose, University of Aarhus (Denmark), on ubiquitous instrumental interaction.

7.5. International Research Visitors

7.5.1. Visits of International Scientists

- Marcelo Wanderlay, Professor at McGill University, Canada, May 2014.
- Shumin Zhai, Senior Staff Research Scientist at Google, USA, July 2014.
- Chat Wacharamanotham, Ph.D. candidate at RWTH Aachen, Germany, June 2014.

7.5.1.1. Internships

- Ignacio Avellino Martinez, Master Student from Univ. Trento and Univ. Aachen, was an intern at InSitu from Apr 2014 until Sep 2014 to work on telepresence systems for large interactive spaces. He was then granted an Inria CORDI grant pursue a Ph.D. at InSitu.

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Scientific events organisation

8.1.1.1. Member of the organizing committee

- UIST 2014, *ACM Symposium on User Interface Software and Technology*, Hawaii, 2014: Stéphane Huot (Video Previews Co-Chair)

8.1.2. Scientific events selection

8.1.2.1. Chair of conference program committee

- IHM 2014, *Conférence Francophone d'Interaction Homme-Machine*: Olivier Chapuis (Papers Co-Chair)

8.1.2.2. Member of the conference program committee

- CHI 2014, *ACM Conference on Human Factors in Computing*: Wendy Mackay
- UIST 2014, *ACM Symposium on User Interface Software and Technology*: Wendy Mackay
- DIS 2014, *ACM conference on Designing Interactive Systems*: Wendy Mackay
- NIME 2014, *New interfaces for Musical Expression*: Stéphane Huot, Theophanis Tsandilas
- MOCO 2014 - *International Workshop on Movement and Computing*: Michel Beaudouin-Lafon
- DI 2014 - *First International Conference Digital Intelligence*: Michel Beaudouin-Lafon
- GD 2014 - *22nd International Symposium on Graph Drawing*: Anastasia Bezerianos
- GRAPP 2014 - *10th International Conference on Computer Graphics Theory and Applications*: Cédric Fleury
- IHM 2014, *Conférence Francophone d'Interaction Homme-Machine*: Theophanis Tsandilas

8.1.2.3. Reviewer

- ACM CHI 2014: Caroline Appert, Michel Beaudouin-Lafon, Anastasia Bezerianos, Olivier Chapuis, Stéphane Huot, Can Liu, Theophanis Tsandilas

- ACM UIST 2014: Caroline Appert, Michel Beaudouin-Lafon, Anastasia Bezerianos, Olivier Chapuis, Can Liu, Theophanis Tsandilas
- ACM EICS 2014 - ACM Symposium on Engineering Interactive Computing Systems: Stéphane Huot
- ACM ITS 2014 - ACM Conference on Interactive Tabletop and Surfaces: Anastasia Bezerianos, Olivier Chapuis, Theophanis Tsandilas
- ACM MobileHCI 2014 - ACM Conference on Human-Computer Interaction with Mobile Devices and Services: Caroline Appert, Olivier Chapuis
- IEEE 3DUI 2014 - IEEE Symposium on 3D User Interfaces: Cédric Fleury
- IEEE InfoVis 2014 - IEEE Information Visualization Conference: Anastasia Bezerianos
- IEEE EuroVis 2014 - Eurographics/IEEE Symposium on Visualization: Anastasia Bezerianos
- IEEE VAST 2014 - Visual Analytics Software and Technology: Anastasia Bezerianos
- 3DVIS @ IEEE VIS 2014 - IEEE VIS Workshop on 3DVis: Cédric Fleury
- 3DCVE @ IEEE VR 2014 - IEEE VR Workshop on Collaborative Virtual Environments: Cédric Fleury
- GI 2014 - Graphics Interface Conference: Theophanis Tsandilas

8.1.3. Journal

8.1.3.1. Member of the editorial board

- Editor for the Human-Computer Interaction area of the new ACM Books Series (published with Morgan & Claypool Publishers): Michel Beaudouin-Lafon (2013-)
- CACM, *Communications of the ACM*, ACM: Wendy Mackay (2008-)
- TOCHI, *Transactions on Computer Human Interaction*, ACM: Michel Beaudouin-Lafon (2009-)
- JIPS, *Journal d'Interaction Personne-Système*, AFIHM: Michel Beaudouin-Lafon (2009-)
- IJHCS, *International Journal of Human-Computer Study*, Elsevier: Michel Beaudouin-Lafon (Member of the Advisory Board, 2009-)
- JCSCW, *Journal of Computer Supported Cooperative Work*, Springer: Michel Beaudouin-Lafon (Member of the Advisory Board, 2010-)

8.1.3.2. Reviewer

- Transactions on Computer-Human Interaction (TOCHI), ACM: Caroline Appert, Michel Beaudouin-Lafon, Olivier Chapuis, Stéphane Huot, Wendy Mackay
- Transactions on Visualization and Computer Graphics (TVCG): Anastasia Bezerianos, Cédric Fleury
- International Journal of Human-Computer Studies (IJHCS), Elsevier: Olivier Chapuis, Stéphane Huot
- Journal on Multimodal User Interfaces (JMUI), Springer: Caroline Appert, Stéphane Huot
- International Journal of Geo-Information (IJGI), ISPRS: Caroline Appert
- Journal d'Interaction Personne-Système (JIPS): Michel Beaudouin-Lafon

8.1.4. Research Organizations

- Agence Nationale de la Recherche (ANR), CES "Contenus, connaissances, interactions": Caroline Appert (Evaluation Committee member)
- Agence Nationale de la Recherche (ANR), "Blanc", "Blanc International" and "Jeunes Chercheuses Jeunes Chercheurs" programs: Caroline Appert (reviewer), Theophanis Tsandilas (reviewer)
- AERES Evaluation Committee of Laboratoire d'Informatique de Grenoble (LIG): Michel Beaudouin-Lafon (president)

- Alliance des Sciences et Technologies du Numérique (ALLISTENE), Working group “Knowledge, Content and Interaction”: Wendy Mackay and Michel Beaudouin-Lafon (members)
- Alliance des Sciences et Technologies du Numérique (ALLISTENE), Working group “Interactions des mondes physiques, de l’humain et du monde numérique” for the National Research Strategy agenda: Michel Beaudouin-Lafon (co-chair)
- Steering Committee of “Institute for Digital Society” (Université Paris-Saclay): Michel Beaudouin-Lafon (member)
- Scientific Committee of IRCAM: Michel Beaudouin-Lafon (member)
- Scientific Committee of AmiQual4Home “Equipement d’Excellence” (Grenoble): Michel Beaudouin-Lafon (member)
- Research Commission of Institut Telecom: Michel Beaudouin-Lafon (member)
- Research Commission of DigiCosme LABEX (Université Paris-Saclay): Michel Beaudouin-Lafon (member)
- Working Group of the future Computer Science Department of Université Paris-Saclay: Michel Beaudouin-Lafon (member)

8.1.5. Learned Societies

- Association Francophone d’Interaction Homme-Machine (AFIHM): Olivier Chapuis (member of the board, vice-president), Stéphane Huot (member of the board and of the scientific council – CPPMS)
- Paris SIGCHI Local Chapter: Caroline Appert (treasurer), Anastasia Bezerianos (president)
- ACM SIGCHI Conference Management Committee: Wendy Mackay (member)
- ACM Europe Council: Michel Beaudouin-Lafon (member)
- EUACM, ACM Europe’s public policy office: Michel Beaudouin-Lafon (member)
- ACM Publications Board subcommittees: Michel Beaudouin-Lafon (future of the ACM DL), Wendy Mackay (new publications)

8.1.6. Hiring committees

- Univ. Paris-Sud hiring committee, Commission Consultative des Spécialistes de l’Université 27ème section (computer science), members: Michel Beaudouin-Lafon, Stéphane Huot, Wendy Mackay, Caroline Appert
- Univ. Paris-Sud hiring committee, Comités de Sélection 27ème section (computer science), members: Michel Beaudouin-Lafon, Stéphane Huot, Wendy Mackay
- Inria Senior PES committee, member: Wendy Mackay

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

Interaction Masters (Research Master in Computer Science, Interaction Specialty): Anastasia Bezerianos & Michel Beaudouin-Lafon, Chairs, Cédric Fleury, Internships organization, M2, Univ. Paris-Sud

HCID Masters (EIT ICT Labs European Master in Human-Computer Interaction and Design): Michel Beaudouin-Lafon & Anastasia Bezerianos, Chairs, M1 & M2), Univ. Paris-Sud

DUT Informatique: Stéphane Huot, Director of studies for the 1st year, IUT Orsay – Univ. Paris-Sud
Masters in Computer Science & HCID Masters: Anastasia Bezerianos, Cédric Fleury & Theophanis Tsandilas, *Programming of Interactive Systems*, 63 hrs, M1, Univ. Paris-Sud

Research Masters in Computer Science: Wendy Mackay & Anastasia Bezerianos, *Formation à la Recherche* 45 hrs, M2 (all research specialties), Univ. Paris-Sud

Interaction Masters & HCID Masters: Michel Beaudouin-Lafon, *Fundamentals of Human-Computer Interaction*, 38 hrs, M1/M2, Univ. Paris-Sud

Interaction Masters & HCID Masters: Wendy Mackay, *Design and Evaluation of Interactive Systems*, 63 hrs, M1/M2, Univ. Paris-Sud

Master 2 Professional: Anastasia Bezerianos, *Design and Evaluation of Interactive Systems*, 38 hrs, M2Pro, Univ. Paris-Sud

Interaction Masters: Anastasia Bezerianos, *Mixed Reality and Tangible Interaction*, 18 hrs, M2, Univ. Paris-Sud

Interaction Masters: Michel Beaudouin-Lafon & Cédric Fleury, *Groupware and Collaborative Interaction*, 38 hrs, M2, Univ. Paris-Sud

HCID Masters: Caroline Appert, *Evaluation of interactive systems*, 63 hrs, M1, Univ. Paris-Sud

HCID Masters: Anastasia Bezerianos, Wendy Mackay, Michel Beaudouin-Lafon, *Human-Computer Interaction project*, 50 hrs, M1, Univ. Paris-Sud

Polytech Fifth year: Cédric Fleury, *Réalité Virtuelle et Interaction*, 40 hrs, M2, Univ. Paris-Sud

Polytech Third year: Anastasia Bezerianos, Olivier Chapuis, *Interaction Homme-Machine*, 18 hrs, M1, Univ. Paris-Sud

Polytech Third year: Cédric Fleury, *Projet Java-Graphique-IHM*, 24 hrs, M1, Univ. Paris-Sud

Polytech First year: Cédric Fleury, *Introduction à l'Informatique*, 38 hrs, L1, Univ. Paris-Sud

Licence Second year: Anastasia Bezerianos, *Developpement Logiciel*, 15 hrs, L2, Univ. Paris-Sud

DUT Informatique: Stéphane Huot, *Introduction à l'Interaction Homme-Machine*, 100 hrs, L1, IUT Orsay – Univ. Paris-Sud

DUT Informatique: Stéphane Huot, *Programmation Orientée Objet*, 21 hrs, L2, IUT Orsay – Univ. Paris-Sud

8.2.2. Supervision

PhD Students

PhD : Jérémie Garcia, *Supporting creative activities with interactive paper*, defended on 10 June 2014, Wendy Mackay & Theophanis Tsandilas

PhD in progress : David Bonnet, *Gesture-based interactions and instrumental interaction*, October 2011, Michel Beaudouin-Lafon & Caroline Appert

PhD in progress : Ghita Jalal, *Co-Adaptive Systems*, September 2013, Wendy Mackay

PhD in progress : Alexandre Kouyoumdjian, *Multimodal Selection of Numerous Moving Targets in Large Visualization Platforms: Application to Interactive Molecular Simulation.*, October 2013, Stéphane Huot, Patrick Bourdot & Nicolas Ferey (LIMSI-CNRS)

PhD in progress : Can Liu, *Collaborative Multiscale Navigation and Interaction*, October 2012, Michel Beaudouin-Lafon, Olivier Chapuis & Eric Lecolinet (Telecom ParisTech)

PhD in progress : Justin Mathew, *New visualization and interaction techniques for 3D spatial audio*, June 2013, Stéphane Huot & Brian Katz (LIMSI - CNRS)

PhD in progress : Daniel Strazzulla, *Multimedia Communication*, October 2012, Wendy Mackay

PhD in progress : Oleksandr Zinenko, *Interactive Code Restructuring*, September 2013, Stéphane Huot & Cédric Bastoul (Université de Strasbourg)

PhD in progress : Ignacio Avellino, *Remote Collaboration in Large Interactive Spaces*, September 2014, Michel Beaudouin-Lafon & Cédric Fleury

PhD in progress : Nolwenn Maudet, *Substrates and Co-Adaptive Instruments*, September 2014, Wendy Mackay & Michel Beaudouin-Lafon

PhD in progress : Jessalyn Alvina, *Mobile Co-Adaptive Instruments*, September 2014, Wendy Mackay

PhD in progress : Marc-Emmanuel Perrin, *Novel Interaction Models for Multi-surface Visualization*, September 2014, Michel Beaudouin-Lafon & James Eagan (Télécom ParisTech)

Masters students

Nolwenn Maudet, UTC Compiègne, “Substrates and Co-Adaptive Instruments ”: Wendy Mackay (2014)

Ignacio Avellino, RWTH Aachen, “Audio-Video support for Remote Collaboration”: Cédric Fleury (2014)

Guilherme Soares, Univ. Paris-Sud, “Instrumental Interaction for Neuroanatomy Imaging”: Michel Beaudouin-Lafon (2014)

Niyati Chowdhury, Univ. Trento, “Interactive Brain Visualization”: Michel Beaudouin-Lafon and Wendy Mackay (2014)

Olutosin Oduwale, Univ. Paris-Sud, “Distributed Video Editing on a Wall-Size Display”: Wendy Mackay & Can Liu (2014)

Thanassis Taousakos, Univ. Paris-Sud, “Detecting and Simplifying Users’ Routines on Mobile Devices”: Anastasia Bezerianos & Caroline Appert (2014)

Paola Pastor, Univ. Paris-Sud, “Making non-interactive surfaces interactive”: Wendy Mackay & Daniel Strazzulla (2014)

Chen Wang, Univ. Paris-Sud, “BFF Band: Rethinking Personal Communication”: Wendy Mackay & Daniel Strazzulla (2014)

Lucien Bobo, ENS Cachan, “Comm Apps for Remote Communication”: Wendy Mackay & Daniel Strazzulla (2014)

Louis Faucon, Ecole Polytechnique, “Interactive Communication Bands”: Wendy Mackay & Daniel Strazzulla (2014)

Jianqiao Li, Ecole Polytechnique, “Dynachord - Combining chord and gesture recognition”: Wendy Mackay (2014)

Miguel Rodriguez and Gabriella Villalobos, Univ. Paris-Sud, “Video Clipper - Structured Capture of Video Data”: Wendy Mackay (2014)

Bruno Fruchard, Univ. Paris-Sud, "Development of flexible mobile interfaces on Android". Olivier Chapuis & Anastasia Bezerianos (2014)

8.2.3. Juries

- University of Munich Doctoral Consortium: Wendy Mackay, jury member
- Olivier Beaudoux (ESEO Angers) – Habilitation à Diriger des Recherches: Michel Beaudouin-Lafon, jury member
- Frédéric Bevilacqua (IRCAM) – Habilitation à Diriger des Recherches: Michel Beaudouin-Lafon, reviewer
- Riad Akrouf (LRI) – PhD committee: Michel Beaudouin-Lafon, examiner
- Jérémie Gilliot (Université de Lille, Lille) – PhD committee: Stéphane Huot, reviewer
- Samuel Huron (Université Paris-Sud) – PhD committee: Wendy Mackay, jury member
- Yvonne Jansen (Inria Saclay) – PhD committee: Michel Beaudouin-Lafon, president
- Cédric Mivielle (Télécom Paris) – PhD committee: Wendy Mackay, jury member
- Charles Perrin (Inria) – PhD committee: Michel Beaudouin-Lafon, president
- Maria Cristina Riff Rojas (Université Paris-Sud) – PhD committee: Wendy Mackay, examiner
- Thomas Vincent (Université de Grenoble, Grenoble) – PhD committee: Stéphane Huot, reviewer
- Jean-Luc Vinot (Université Toulouse III - Paul Sabatier) – PhD committee: Wendy Mackay, reviewer
- Tenure case in the USA: Michel Beaudouin-Lafon, reviewer

8.3. Popularization

- “*L’homme doit contrôler l’ordinateur, pas l’inverse*”, Interview on Arte Television Future Mag, February 2014: Wendy Mackay <http://www.futuremag.fr/interview-integrale/lunettes-connectees-interview-avec-wendy-mackay>
- “*Quid sit musicus*”, World premiere at IRCAM on June 18, 2014 of the piece composed and directed by Philippe Leroux: Jérémie Garcia designed and developed technology and tools used in the composition and performance of the piece.
- “*PaperTonnetz*” and “*Dessines moi un paysage*”, Public Exhibition at Futur-en-Seine festival, June 2014: Jérémie Garcia. The demonstration was covered by the online news site 01net.com.
- “*L’être humain au coeur de la recherche en IHM*”, SIF Blog, Le Monde, July 2014: Interview of Wendy Mackay by Serge Abiteboul and Claire Mathieu.
- “*Interfaces de demain, la fin du tactile ?*”, conference at Université du Temps Libre Essonne, December 2014: Michel Beaudouin-Lafon.
- Scientific committee of the S-Cube association (Scientipole-Savoirs-Société) on the Saclay campus for an exhibit on the brain: Michel Beaudouin-Lafon (2013-2014).

9. Bibliography

Major publications by the team in recent years

- [1] C. APPERT, S. HUOT, P. DRAGICEVIC, M. BEAUDOUIN-LAFON. *FlowStates: Prototypage d’applications interactives avec des flots de données et des machines à états*, in “Proceedings of IHM 2009”, ACM, Octobre 2009, pp. 119-128, Best Paper Award, <http://doi.acm.org/10.1145/1629826.1629845>
- [2] M. BEAUDOUIN-LAFON, O. CHAPUIS, J. EAGAN, T. GJERLUFSEN, S. HUOT, C. KLOKMOSE, W. E. MACKAY, M. NANCEL, E. PIETRIGA, C. PILLIAS, R. PRIMET, J. WAGNER. *Multi-surface Interaction in the WILD Room*, in “IEEE Computer”, 2012, vol. 45, n^o 4, pp. 48-56, <http://dx.doi.org/10.1109/MC.2012.110>
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