Disasters in Personal Informatics: The Unpublished Stories of Failure and Lessons Learned

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ABSTRACT
Though never a desirable outcome, failure is an inevitable part of research. Too often, however, the tried but failed paths are lost in the translation of work to publication. With the pragmatics of publishing (*e.g.*, page limits) and the academic emphasis on positive outcomes, failed processes, methodologies, study designs, and technologies are frequently not disclosed. This is a missed opportunity, particularly for nascent areas like *Personal Informatics* (PI) as well as other research areas, more generally, that share high costs in time, development, and recruitment for building and deploying testable systems. Thus, we propose a UbiComp2014 workshop focused on failures in PI research. Through short participant authored papers, breakout sessions, madness talks, and all-group discussions, our overarching workshop goals are to share "disaster" stories, reflect on lessons learned, and articulate promising paths forward.

Author Keywords
Quantified Self, Personal Informatics, Methods, Studies, Technologies, Health, Sustainability, Financial Tracking

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
"Enlightened trial and error outperforms the planning of flawless intellect" –David Kelley [5].

In this workshop, our goal is to uncover, analyze, discuss, and learn from the failures of Personal Informatics (PI) and Quantified Self (QS) research—failures that are most often not captured or surfaced in traditional publications because of embarrassment, perceived irrelevance, or simply lack of space. We want to provide an explicit forum to share stories of failure, perhaps even entire lines of research that did not succeed, in order to synthesize lessons learned and help progress the PI research community forward.

Our workshop builds on the successful four previous *Personal Informatics* workshops at CHI2010-CHI2013 [1–4] but with a particular aim towards engaging the UbiComp/Pervasive Computing audience. This community is increasingly engaged in PI-related research and particularly has expertise in building and deploying highly technical systems, where many of the challenges of PI lie. PI researchers in general—and those in UbiComp in particular—have much to benefit from surfacing UbiComp's collective knowledge about the challenges in this space.

We hope to derive a set of concrete directions for future work in the personal informatics field from the collective experiences of participants engaged in QS related research from an HCI and UbiComp perspective.

WORKSHOP GOALS AND TOPICS
Over the last several years, interest in the field of Personal Informatics (PI) has been rising at a fast pace. This has been fueled in large part by the availability and popularization of smartphone applications and activity tracking devices such as the Fitbit, the Nike FuelBand and the Jawbone UP.

Personal Informatics research activity in HCI and Ubiquitous Computing has kept pace with this trend. A large number of papers related to personal data and quantification have been submitted to top-tier conferences (e.g., CHI, UbiComp) and workshops, such as the ones we have organized [1–4].

One unique element of PI research is that it is intrinsically tied to people's own life experiences. It is characterized by the collection, visualization and analysis of *real personal data*, whether it is financial, health, or productivity-related. While it might be possible to conduct lab-studies or simulate personal informatics data, research outcomes are significantly more valuable when researchers sense and interface with individuals in practice. Consequently, the research community's efforts have been oriented towards deploying personal informatics systems in *real-world* settings. In this practical context, however, successful research faces numerous challenges, from privacy issues, to

efficient data collection, to methodological barriers—all potential failure points—in addition to overcoming prototypical engineering complexities associated with building *deployable* systems..

As evidenced by the high-quality and community validation of some of the PI papers published in the last few years [6], it is clear that many researchers have been successfully navigating the treacherous waters of PI system deployment in ecologically-valid settings. However, anecdotally—and from our own experience—even the most successful research initiatives in this domain endured missteps and failures.

Since failures are most often excluded from the traditional publication format due to a number of factors, the aim of this workshop is to bring PI researchers together in an environment where sharing mistakes and stories of failure is encouraged. We feel that many researchers would greatly benefit from a solid set of practical, community-harvested guidelines and methodologies for conducting PI research in light of the challenges in this space. New PI researchers would particularly benefit from the surfacing of this institutionalized knowledge, as detours caused by repeating previous researchers' mistakes can delay a project on the order of months or years without meaningfully advancing research goals. Therefore, the output of the workshop will be a document of publishable quality that synthesizes best practices for the field of Personal Informatics.

In our view, the workshop format seems ideal for such effort; it will be organized as an open forum where researchers will have the opportunity to share experiences and identify common challenges we have faced in this space. It also presents the opportunity to form new collaborations going forward.

Topics of Interest

We will invite contributions on topics associated with research failure points, including but not limited to:

- **User Study Design**: How decisions affecting the design of studies proved to be flawed, affected the validity of results, led to biases, or constrained findings.
- **Privacy and Security**: Approaches that could threaten the privacy of individuals or expose study participants to harm or discomfort.
- **Field Deployment**: Undesirable issues that emerged only in real-life deployments and could not be anticipated.
- **Hardware and Software**: The role that hardware and software platform choices played in failed experiments (*e.g.*, open *vs.* proprietary, custom *vs.* off-the-shelf, web, mobile, desktop, wearables, sensors)
- **Data Collection**: How different approaches for data collection could compromise the data (*e.g.*, in case of hardware failure).
- **Methods and Techniques**: Misuse of tools and instruments, such as poorly produced surveys and experience sampling abuse.
- **User Interfaces**: How UI design influenced findings, proved to be an obstacle in terms of user experience, provided misguided feedback or steered participants away from the task at hand.
- **APIs**: Issues around querying user data through third-party APIs, both in terms of technical approaches that proved limiting/unsuccessful or that violated terms of service agreements.

WORKSHOP PLAN AND PROCESS

Before the Workshop

We will invite participants from a broad range of disciplines, including technologists, behavioral scientists, designers, and artists to submit two-to-four page papers describing their PI-related disasters, a retrospective analysis of what went wrong and why, and a synthesis of lessons learned. Papers will be reviewed by the committee based on their topic relevance, exposition, and potential to provoke thoughtful discussion. Each paper will receive at least 3 independent reviews and we will select 15-20 papers in total.

We have observed an increasing level of quality of the submissions we have received at previous workshops. In previous workshops we have hosted accepted papers on the website http://personalinformatics.org; however, for this workshop we propose to also include accepted papers in the ACM Digital Library and the supplemental proceedings of the conference in order for our high-quality submissions to reach a broader audience.

For recruitment, we aim to actively solicit submissions from a wide range of disciplines. We will create a website hosted at http://personalinformatics.org (where previous workshops are also hosted) to advertise the workshop, communicate between organizers and participants, and post the workshop plan. We will also post links to workshop day notes and follow-up information.

To foster and facilitate all-group discussion, we will limit the total number of participants to 25 participants including the 4 organizers.

Workshop Dates

Important dates for the workshop include:

Apr 18 Announcement of the workshop and CfP
Jun 1: Deadline for workshop paper submissions
Jun 16: Author notifications
Jun 30: Deadline for camera-ready paper
Sep 13/14: Workshop

Workshop Schedule

We will follow the one-day format we successfully employed in previous PI workshops (with the exception of

CHI2013 [3], which was a two-day workshop oriented around a Hackathon).

The workshop day will be split between rapid, five-minute "workshop madness" talks summarizing the authors' workshop papers, small-group breakout discussions, and full-group presentations that distill and summarize the breakout sessions. The "workshop madness" talks will be timed to ensure that participants adhere to the 5-minute length. This is to make sure that the workshop sticks to the schedule, while all participants get a chance to present and discuss their work. Discussions of the presentations will be a part of the breakout session.

Submitted papers will be analyzed by the organizing committee for common, emergent themes around both *failures* and *lessons learned*. These themes will form the basis of the two breakout sessions. Attendees will be pre-assigned breakout groups to help foster and balance discussion.

The morning session will begin with brief introductory remarks, an ice-breaker, and then move immediately to the first madness session. After morning coffee break, we will split-up into prearranged small groups for the first breakout session (*failures*). We will reserve the last 20 minutes before lunch for group distillation and discussion.

The afternoon session will mirror the morning with madness, the second breakout session (*lessons learned*), and finishing with a ~45 minute synthesis and all-group discussion. For all sessions, we will employ a shared Google Doc for collective note taking. Again, this approach was successful in previous workshops and allows for an easy, on-going record of the day's events and discussions.

A draft outline of the workshop program:

9:00 - 9:15: Introductory remarks and ice breaker
9:15 - 10:15: Workshop madness (fast talks + q/a)
10:15 - 10:30: Coffee Break
10:30 - 12:00: Breakout session (small group discussions)
12:00 - 2:00: Lunch
2:00 - 3:00: 2nd half of workshop madness (fast talks + q/a)
3:00 - 3:30: Coffee Break
3:30 - 4:30: Breakout Session II (small group discussions)
4:30 - 5:30: Synthesis and group discussion
5:30 - 6:00 Closing
8:00 - 9.30 Meeting with the local Seattle QS meetup group

In the evening, after the workshop main program, we will meet with the local Seattle branch of the Quantified Self group. This provides a unique opportunity to bridge academia with an accessible group of practitioners (QS self-trackers) that is already sharing ideas, methods and experiences in a structured way. We have done this at previous workshops and participants found this very valuable—it builds connections beyond academia and the HCI/UbiComp community.

After the Workshop

To promote and disseminate our research findings, we are planning three initiatives as outcomes of the workshop:

- We propose to include accepted papers and the supplemental proceedings of the conference in the ACM Digital Library. This will make it easier to expose the work to a broader audience while making all papers searchable, and thus easier to reference, by the Personal Informatics community.
- We will produce a document that synthesizes best practices for the field of Personal Informatics, giving special emphasis to lessons learned in light of failures from use cases, as told by workshop attendees. We will host this document at the http://personalinformatics.org web site.
- We will submit our PI best practices paper to a journal and/or format it as an article for a magazine (e.g., IEEE Pervasive Computing).

THE ORGANIZERS

Two of the organizers (Jon and Jakob) have organized previous Personal Informatics workshops, while the other two organizers (Edison and Matthew) have been PI workshop participants. Below, we present a summary of the organizers' biographies:

Jon Froehlich is an Assistant Professor in Computer Science at the University of Maryland, College Park, a member of the Human Computer Interaction Laboratory (HCIL), and founder of the Makeability Lab and HCIL Hackerspace. His research interests include designing sensing and feedback systems to promote healthy and proenvironmental behaviors. He has been working on QS-related systems since 2006.

Matthew Kay is a Ph.D. student in Computer Science & Engineering at the University of Washington. His research centers on user understanding of data—and particularly data uncertainty—in personal informatics systems. He has focused primarily on health systems, and has published best papers at UbiComp on personal informatics of sleep- and weight-related data.

Jakob Eg Larsen, Ph.D. is Associate Professor in Cognitive Systems at the Technical University of Denmark (DTU) where he is heading the mobile informatics lab (milab). His research interests include HCI, personal informatics, and mobile/wearable sensing for assistive technologies and health applications.

Edison Thomaz is a Ph.D. candidate in the School of Interactive Computing at Georgia Tech, in the Human-Centered Computing program. In his research he focuses on building systems that can sense, recognize and model people's everyday life activities in service of health and well-being applications. Edison has worked on Personal Informatics systems at France Telecom R&D, at Slife Labs, LLC and throughout his graduate studies.

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