The Future of Personal Informatics: Agenda, Methods, and Education

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Abstract
Personal Informatics tools have received an outburst of interest both in research and practice, with the premise of using tracked data to provide self-knowledge, reflection, and regulation of behaviors. We propose a workshop discussing the future of personal informatics, including research and training. We aim to outline a research agenda for the next ten to twenty years, distill a set of lessons learned from running and reporting on studies of personal informatics tools, and develop a key set of skills a new student in personal informatics should know.

Author Keywords
Personal informatics; quantified self; personal tracking; research agenda; evaluation; reporting; curriculum.

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

Background
Personal Informatics (PI) and Quantified-Self (QS) tools have received an outburst of interest both in research and practice, with the premise of providing self-knowledge, reflection, and regulation of behaviors. Consumer awareness and interest in these devices has tripled over the last couple of years [30]. Ownership

rates have followed similar trends, with one in every two U.S adults claiming to own, or have owned, a device for personal tracking [27]. The recent rise of wearable devices has made self-tracking evermore present in the everyday life, opening opportunities and challenges for researching the daily practices and design space of these devices.

Several workshops at CHI [8,21,22,23,24,25], UbiComp [11,28,29], CSCW [2], DIS [1], and IEEE VIS [26] have focused on personal informatics or quantified self. These workshops have emphasized developing a community of researchers and practitioners interested in the topic, sharing in-progress research and experiences, and discussing directions for the field.

This workshop follows in the tradition of these prior workshops, with a focus on the future of the field. Now that PI is an established research area, new challenges have emerged. For example, many PI-focused courses have been developed for undergraduate, masters, and PhD students to teach necessary skills and foundational knowledge for studying and designing PI tools. However, there are now far too many readings across multiple disciplines relevant to personal informatics to assign all of them in a single course. There is now an opportunity to have a meaningful conversation about what a new student needs to know when starting to explore PI research and practice.

This workshop has three specific goals relevant to the future of personal informatics:

1. Outlining a potential research agenda for personal informatics over the next ten to twenty years. Participants will discuss open questions in the field and offer recommendations for what is most important to explore.
2. Distilling a set of lessons learned from running and reporting on studies of personal informatics tools. Participants will discuss their own positive and negative experiences running studies and compile a list of useful information for future researchers.
3. Developing a list of key skills which a new student in personal informatics should know. This list will be developed into syllabus and set of readings for a course or seminar in personal informatics, or specific activities a new student can undertake to develop these skills. Participants will discuss their experiences learning core concepts in personal informatics or teaching a class on it and identify important topics to cover.

We will ask workshop submissions to address one of these goals, with separate submission criteria for each. Each submission will be reviewed by at least two organizers, with a third as necessary if opinions are split. Submissions, between 2 and 6 pages in CHI extended abstract format will be evaluated according to their potential to provoke and contribute to discussion for the relevant workshop goal(s).

At the workshop, we will divide discussion into three groups, one for submissions about each of the three goals. We will encourage participants to discuss their ideas for each goal prior to the workshop. To facilitate this discussion, we will synthesize themes from the ideas proposed in the workshop papers and share our findings with workshop participants at least a month ahead of the workshop.

Outlining a Future Research Agenda
Li et al.'s stage-based model defined the area of personal informatics as collecting and understanding personal data for self-improvement [20]. Since this model's development, research in HCI has broadly explored how to design tracking tools to support goals people have (e.g., [4,12,13,14,17]) understanding how people use tracking tools in their everyday lives (e.g., [9,12,31]), and problems people often encounter with personal tracking (e.g., [5,7,19]).

Participants will have the opportunity to suggest and discuss topics in PI and QS which they believe are important for researchers to explore over the next ten years. For this submission category, participants should describe a topic where further study is needed or propose a vision of what PI might look like ten to twenty years from now. In both cases, submissions should outline immediate research questions or steps the research community could tackle over the next five years.

Distilling Lessons Learned from Studies
Researchers often strive to understand the impact personal informatics tools have on people through studies, such as trying to understand whether the tools impact people's ability to change their behaviors. However, running studies with or on PI tools can be challenging. Behavior change is a complex process which unfolds over a long time, making it difficult to validate the effectiveness of a PI tool [18]. People often lapse in their use of PI tools or switch or abandon entirely [9], making it challenging to gather data consistently. When reporting on findings from studies of PI tools, it can be problematic to extend findings from one PI tool to others [6].

In this category, participants will share and discuss their experiences running studies of PI tools. Participants will then distill a set of lessons learned from these experiences, which can inform and inspire how future studies of PI tools are conducted. Submissions to this category can highlight examples of particularly effective studies or summarize lessons learned from studies which did not succeed as planned.

Developing a List of Key Skills for New Students
Finally, PI is now being taught at many levels of higher education to introduce students to the topic and teach skills necessary when researching and practicing in PI. We are aware of six recent graduate courses and seminars in PI from major institutions in the United States [3,10,15,16,32,33]. These courses share many common readings from personal informatics. Some add assignments where students must collect and reflect on their own PI data or design a new PI tool.

Participants in this category will create a list of key skills a student new to personal informatics should know, and how to approach teaching those skills. Participants could develop this list into a syllabus for a course in personal informatics and discuss what readings to include in that course. Participants will develop variations of key skills for students who are research-oriented (e.g., for PhD students) and practitioner-oriented (e.g., for undergraduate or master's students) and suggest modifications based on audience (e.g., for students in Computer Science versus Health Informatics). Alternatively, workshop participants could recommend alternative activities for developing skills in personal informatics, such as introducing students to tracking and reflection of data about themselves.

Submissions to this category can be a syllabus from a participant's prior experience teaching a course, a hypothetical syllabus, or an account from a student who took such a course. Submissions can also propose alternative methods for introducing students to personal informatics, such as activities for brainstorming new PI tools or assignments on collecting and reflecting on data with a commercial tool.

Organizers

The organizers have a history of research and practice in the space of PI/QS. They regularly participate in and organize workshops and symposia on the topic. Two organizers have taught graduate courses on PI/QS.

Daniel A. Epstein (main contact) is a Ph.D. Candidate in Computer Science & Engineering at the University of Washington. He studies people's experiences with personal tracking tools to understand and design tools which better integrate into people's everyday lives and practices.

Rúben Gouveia is a Ph.D. student at Madeira Interactive Technologies Institute. He has focused his research on understanding how individuals engage with personal informatics tools in their daily lives. He attempts to leverage on such insights towards predicting and personalizing moments of engagement.

Eun Kyoung Choe is an Assistant Professor in the College of Information Sciences and Technology at the Pennsylvania State University. She has been examining ways to help people become empowered individuals through fully leveraging their personal data. She has been exploring this topic in various contexts including the QS movement, sleep, patient-clinician communication and data sharing, and personal data insights and visualization.

Jodi Forlizzi is a Professor in the Human-Computer Interaction Institute at Carnegie Mellon University. Her research explores personal data as it affects health, identity, legacy, and behavior change.

Evangelos Karapanos is an Assistant Professor of Social Computing at Cyprus University of Technology where he leads the Persuasive Technologies Lab (http://persuasive.cut.ac.cy/). His work inquires into the use and impact of Personal Informatics tools in real life, and designs new approaches to support behavior change. He is currently building a course on Persuasive Technologies.

Sean A. Munson is an Assistant Professor of Human Centered Design & Engineering at the University of Washington. Munson designs and evaluates technologies to help people make sense of data about their behaviors, the consequences of those behaviors, and the world around them, with a particular focus on supporting health behaviors. He has taught two doctoral level seminars in the area of personal informatics.

Ernesto Ramirez is the Director of Research & Development at Fitabase, a consumer wearable data management platform servicing the research community. He has extensive experience with the Quantified Self community as the past Program Director of Quantified Self Labs. He has also designed and executed research to better understand the behavioral techniques individuals employ when using personal informatics tools.

Website

Our workshop proposal is posted on http://personalinformatics.org/chi2017. This website includes details from five previous workshops on personal informatics at CHI and UbiComp [11,21,22,23,24]. This will allow interested participants to read and calibrate against submissions to the previous related workshops.

The website includes the call for participation and links to the websites of each of the organizers. We will post the accepted workshop papers on this page. We will also collect and share the materials people submit and bring to the workshop, such as course syllabi. Finally, we will post the final white papers generated by each group.

Pre-Workshop Plans

We have developed the workshop website. We could be ready to accept workshop submissions at the email address on the website and in our workshop call.

We will aim to balance the number of workshop papers focusing on each goal, but acknowledge that this may not be possible given participants' varied interests. The organizing committee is diverse in terms of affiliations and areas of interest, which should help us recruit a varied set of submissions. We have begun soliciting submissions on classroom syllabi and reading lists from academics who we know have taught courses on the subject.

We anticipate we will receive at least three workshop papers for each goal, which should be sufficient for a thoughtful workshop discussion. Should we not receive three papers for a workshop goal, we will combine the discussion at the workshop with that of another goal.

Workshop Structure

This workshop will be primarily discussion-based. To facilitate this, we plan for very short presentations of participant submissions. We will make participant's submissions available to other workshop attendees before the workshop, so interested participants can read ahead of time.

Our rough outline of the workshop program:

9:00-9:15	Introduction, explanation of goals
9:15-10:30	Divide into groups, discussion time
10:30-11:00	Coffee break
11:00-11:30	Presentations by group on workshop submissions, discussion progress so far
11:30-12:30	Discussion time in groups
12:30-14:00	Lunch with group
14:00-15:30	Discussion time in groups
15:00-16:00	Coffee break
16:00-16:30	Final discussion time in groups
16:30-17:30	Report back to other participants
17:00-17:30	Closing, discuss next steps
17:30-	Workshop outing for dinner

Post-Workshop Plans

Where appropriate, we will post the materials people submit and bring to the workshop on the workshop

website. This includes course syllabi participants developed and drew from as well as commentaries on methods and visions for personal informatics, such as Coleman's [6].

Each group will also be responsible for preparing one white paper, which we will post on the workshop website. We will share these white papers other researchers and practitioners in our social networks to spread them within the personal informatics community.

Participants will be encouraged to take their discussion further and submit a conference, journal, or magazine article on what they discussed.

Call for Participation

Personal Informatics and the Quantified Self, or tracking one's self to gain self-knowledge, have grown in interest both in research and commercially. People often use digital tools to track themselves, from wearables such as Fitbit and the Apple Watch to phone apps such as Mint and SleepCycle. This workshop explores how researchers can shape the future of the field. The workshop has three objectives: (1) outlining a research agenda for personal informatics, (2) defining lessons learned from running and reporting on studies of personal informatics tools, and (3) developing a list of key skills which a new student in personal informatics should know.

Interested researchers and practitioners are encouraged to submit 2-6 pages in CHI extended abstract format related to one of the three topics: (1) a research vision or provocation about future work, (2) a description of lessons learned from a particularly effective or challenging study of personal informatics tools, or (3) a used or potential syllabus or account of teaching or taking a course in personal informatics.

Submissions should be emailed to pi_chi2017@uw.edu with the subject line "Workshop Submission". One author of each accepted submission must register for the workshop and at least one day of the conference. More information about the workshop can be found at http://personalinformatics.org/chi2017.

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