Information Technology in Healthcare

Addressing the complexities of today's healthcare issues requires more than one perspective. The Information Technology in Healthcare Track serves as a forum at which healthcare, computer science, and information systems professionals can come together to discuss issues related to the application of information technology in healthcare. In bringing technical, behavioral, clinical, and managerial perspectives together, this track provides a unique opportunity to generate new insights into healthcare problems and solutions.

Minitracks

- Global Health IT Strategies
- Health Behavior Change Support Systems
- IT Adoption, Diffusion, and Evaluation in Healthcare
- IT Architectures and Implementations in Healthcare Environments
- Learning Health Systems
- Mobile Applications and Emerging Technologies for Health Management and Wellness
- Technologies for Clinical Decision-Making, Interventions, and Wellness
- Technologies for Healthy Aging
- User Experience Design for Health and Wellness

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Global Health IT Strategies Minitrack

The global proliferation of information and communication technologies, mobile computing, enhanced security and cloud-based data exchanges have germinated interests in those seeking to apply existing and emerging information technologies to address health issues throughout diverse regions of the world. These include global health education systems, emerging low-cost mobile health apps for all healthcare actors, public health monitoring and tracking systems, emergency response systems, as well as traditional telemedicine applications. These efforts are already impacting the rapid growth and further development of global healthcare solutions and applications arising from the active collaboration among crossdisciplinary researchers, multi-national agencies and international clinical practitioners.

This minitrack will examine broader issues relating to Global Health IT strategies, including similarities and differences in how regions as diverse as North America, Africa, Asia and the Middle-East approach to health improvements, emerging trends for applying innovative health IT solutions to improve general population and community health care globally, new forms and modalities of care delivery aided with Health IT globally such as use of innovative low-cost, mobile and sensor-enabled and other emerging health technological applications. These solutions will provide a multinational perspective on the benefits of mobile health and other emerging information technologies and describes different examples and applications implemented.

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Health Behavior Change Support Systems Minitrack

In the Health Behavior Change Support Systems minitrack, we focus on how systems and services aimed at influencing health and/or wellbeing behavior can be developed, designed and implemented. All Behavior Change Support Systems (BCSS) are persuasive systems; they have been designed with the intent to influence user behaviors. The minitrack will emphasize how persuasive theories and models can be used to develop efficient and effective HBCSSs as interventions for different contexts in healthcare, e.g. persuasive decision support systems for self-care or persuasive games to support chronic care, how end-users can be involved to design HBCSS in practice and what evaluation methods are needed to assess the impact of HBCSS on healthier living.

The topics of the minitrack include the following, but are not limited to them.

- **Design and development:**
  - Effective persuasive strategies at different stages of the persuasion process in achieving A-, B-, or C-Change (attitude, behavior, or compliance)
  - Identifying which persuasive strategies and/or persuasive software features matter most and for whom
  - Persuasive software features to create a proper level of engagement, involvement and user experience
  - Software development approaches for HBCSSs
  - User involvement in design and/or use stages of HBCSS development
  - Stakeholder perspectives (users, experts, or possible others) to create HBCSSs that have value in practice

- **Implementation and evaluation:**
  - Usage data to know the dose, duration, time and format of persuasive strategies
  - Measuring the effects of persuasive strategies and/or persuasive software features on task adherence and/or behavior change during usage and long-term effects
  - Persuasion profiles and matching them with persuasive strategies and corresponding software features
  - Frameworks and methodologies to measure A/B/C-Changes (attitude or behavior change, or an act of compliance) and F/A/R-Outcomes (forming, altering or reinforcing behaviors/attitudes/compliance)
  - Analytics to predict adherence and behavior change, and to identify usage patterns and the effects on them
  - Evaluation methods of perceived and actual persuasiveness of different types of HBCSSs

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IT Adoption, Diffusion and Evaluation in Healthcare Minitrack

This minitrack focuses on the role of adoption, implementation, diffusion, and evaluation factors and the interaction of these factors at various levels to healthcare system success. These successes or failures can be on individual, group, national and international level. Papers may explore these issues for any form of healthcare technology (for example telemedicine, PACS, electronic medical records, mobile health and on-line health). This track is open to all methodologies including, but not limited to case study (business/information systems oriented), survey, experimental design, workflow and other forms of business process modeling, interview, content analysis, conceptual papers, and the various forms of quantitative analysis. In addition, we welcome innovative research focused on adoption, implementation, use, and evaluation in Healthcare Work should be at a mature (data collected and some analysis performed), though not necessarily final stages. Completed, high quality research will receive special consideration. The best papers are often fast tracked to a journal and, for other high quality papers, special issues may be created.

Topics include but are not limited to:

- Application of adoption, implementation, and diffusion theories, models, and constructs to the health care context
  - Unified Technology Adoption & Use Theory (UTAUT) and Technology
  - acceptance model
  - Socio-technical system theory
  - Social learning theory
  - Information Systems Success models
  - Theory of Planned Behavior
  - Organizing Vision and organizational adoption models
  - Information Assurance constructs of confidentiality, integrity, and availability IT
  - Adoption at the individual, project, organizational, or system level
  - Stakeholder analysis
  - User characteristics
  - Organizational or project structure and/or strategies
  - Regional Healthcare Initiatives and Global development
  - Interaction among individual, organizational, project, and/or system level
  - Role/impact of regulatory structures
  - Information Assurance constructs of confidentiality, integrity, and availability
  - E-Health strategies

- IT Implementation
  - Effective implementation strategies
  - Electronic Medical Records and Personal Health Records
  - Health IT project management
  - Participation of professionals in e-health projects
  - The influence of the local system
  - Workflow analysis
  - Information Assurance constructs of confidentiality, integrity, and availability
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IT Architectures and Implementations in Healthcare Environments Minitrack

We invite papers that address IT architectures and implementations in healthcare environments, which range from the communication and dissemination of data/knowledge across healthcare systems, to pervasive healthcare settings, m-health, I-health, and intelligent, ubiquitous healthcare. We would also like to receive papers from a spectrum of disciplines involved in the IT implementations, which may include: personalized medicine, modeling patient behavioral change, and the management of online social-intensive healthcare environments which generate and disseminate healthcare knowledge. Modern IT architectures in healthcare often emphasize the pervasiveness of healthcare software solutions and proliferation of effective IT applications (Apps) which run on Android, iOS and other mobile operating environments.

Specific topics of interest may include:

1. Integrated Solutions in Healthcare:
   - Architectures and implementations of personal healthcare information systems, Software tools for empowering and educating patients, Applications of mining internet health information for health consumers, Personalized decision support systems for preventive healthcare.
   - Architectures and frameworks for achieving interoperability, Deploying its standards and creating conceptual models; Medical vocabularies and terminology for manipulating semantics in heterogeneous health systems.
   - Software tools and services in integrated healthcare: Architectures for and applications of healthcare web services and semantic web technologies and infrastructures in healthcare; Application architectures in public health protection, preventive healthcare and delivery of personalized health services.
   - Complexities and challenges of addressing information overload and sharing data and practices across healthcare systems: Implications for patient records and the management of patient information and their accessibility and transparency; Healthcare application interoperability and e-health interoperability levels.
   - Communicating health-related data: exchange and integration of clinical data, documents and workflows; Dissemination of health related data to healthcare professionals and caregivers; Telemedicine, e-prescribing and medication management, e-health, m-health.

2. Emerging Healthcare Software Implementations in:
   - Personalized medicine: Frameworks and software platforms for personalized medicine which includes science driven approaches to healthcare and the creation of targeted therapies, tailored medical interventions and selection of medicines; Intelligent software models for predictive development of diseases, disease prognosis and their prevention;
   - Drug repositioning and ranking: computational models and solutions for evidence and network based drug repurposing; drug repositioning on the clouds, probabilistic models and algorithms for predicting drug repurposing.
   - Smart healthcare: Health information portals; Educational and social models for self-managed healthcare and healthcare literacy; Internet and doctor-patient relationships; I-doctor; Moving health information amongst health consumers; Personalizing management of illnesses, treatments, rehabilitation regimes.
• Patient tracking: Tracking patients and analyzing their clinical outcomes and results of treatments; Creating statistics on shared healthcare data as a result of patient tracking within and across locations; tracking patients with similar conditions, or for those who had undergone similar treatments.
• Applications of social media and virtual environments in healthcare: social media analysis for healthcare and public healthcare management, virtual spaces for exchange of experiences and information; Infrastructures and architectures for implementing collaborative and virtual healthcare environments;

3. Apps and Relevant Architectures in Healthcare
• Apps for creating innovative healthcare services: Apps for empowering health related mobile gadgets and smart phones; Apps for monitoring fitness, physical and cognitive activities, self-testing of health conditions in patients and for individual’s wellbeing goals;
• Apps for monitoring: Regular medicine intake and general use of certain types of medicine(s), the management of chronic diseases across population, in public health management and health surveys.
• Apps for supporting: New medical practices of collecting, analyzing and interpreting health data in mobile and wireless environments, Generic and disease specific health surveys across health domains and addressing cost saving issues in the delivery of quality healthcare.
• Apps stores for healthcare domain: experiences of using Android and iOS environment in m-healthcare, advantages and drawbacks of creating Apps for healthcare and incentives for investing in m-health software solutions.
• Architectures for creating platforms for m-health: accommodating Apps for health related services, which support new medical practices, workflows and regulations dependent on wireless and mobile technologies; Securing healthcare Apps development environments; Supporting the creation of m-health start-up companies.
• Architectures for Integration: Specifying and placing mobile devices and their Apps in existing healthcare systems for various purposes: from demands for ubiquitous healthcare delivery to addressing relieving pressure on cash-strapped, poorly financed and ill-equipped healthcare institutions and environments.

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Learning Health Systems Minitrack

Spiraling healthcare costs in the United States and elsewhere, coupled to mediocre outcomes and health status indices, the persistent latency between best practice knowledge and its application in practice, an inefficient public health and clinical research infrastructure, and many other factors demand a more sophisticated use of information technology to support improvements. The ever growing increase digitally stored health information opens the enormous potential to improve healthcare through the integration of disperse data stores. The Learning Health System (LHS) is envisioned by many to be the fully integrated health data network that serves as a critical national infrastructure to transform healthcare and improve the population health. The underlying premise is that the healthcare system needs to be (re)designed to more rapidly adjust and address critical population and clinical health conditions if it is to produce demonstrable gains in health outcomes while reducing the overall healthcare related economic burdens on individuals, businesses, and government.

This minitrack will present work advancing the state of knowledge and the state of practice in the area of institutional-, national-, and international-scale learning health systems. This minitrack will support this broad research agenda. We solicit submissions from academic, industry, and policy perspectives on a range of topics related to the development of an LHS. Within these requirements, example research issues of interest include, but are not limited to, the following:

- **LHS Design and Infrastructure** - Application of system science to realization of an LHS; Defining, building, measuring, and tracking confidence and trust in the LHS; Infrastructure design and role of standards for data sharing and data-mining; Governance design for rapid learning and change implementation.
- **LHS Theories** - Models of health systems learning, Adaptive theories of health behavior change, Social-technical models for healthcare improvement.
- **LHS Use Cases** - Improving patient care, Identifying at-risk patients, Tracking community health improvements, Ad-Hoc improvements, Shortening improvement Cycles, Defining and measuring value from a LHS.
- **LHS Stakeholders** - Private Sector incentives (and barriers) for rapid learning, Public policy incentives (and barriers) to rapid learning, Patient empowerment as LHS strategy, Privacy and security analyses.

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Mobile Applications and Emerging Technologies for Health Management and Wellness Minitrack

Mobile applications and Web 2.0 are dramatically influencing how clinicians, caregivers, patients and their families manage care processes. They have the potential to facilitate the design and development of superior healthcare delivery and wellness. There is a trend to foster active patient participation in their care and we are witnessing a plethora of emerging technologies to assist in this regard. In this minitrack, we focus on how mobile applications and emerging technologies might be utilized to address the challenges faced by healthcare management such as escalating cost pressures, the trend for self-management in fitness and wellness, a growing aging population, an increasing prevalence of chronic diseases, and a move to a preventive care focus. Integral to these solutions is a patient-centric view to satisfy consumer expectations and provide high quality care.

This rapidly growing area is expected to play an increasingly important role for healthcare globally. The reasons for this include: the higher mobility of individuals, the need to have active and empowered patients, the trend for self-management in fitness and wellness, the pressure to provide effective and efficient care, the growth in chronic diseases and therefore the demand for new approaches to prevent, monitor, and manage these diseases. This minitrack provides an outlet for all research focused on health and wellness related mobile applications and emerging technologies. Selected papers will be fast-tracked for a special issue in Health and Technology published by Springer. We welcome research in progress or completed research papers that address technological aspects, applications, use cases, theories, and models as well as other critical issues, including but not limited to:

- Analytics of health-related sensor data and social media data.
- Biomedical applications to support health and fitness monitoring.
- Business models and cost-effective concepts to support patient-centric healthcare.
- Impact of Affordable Care, Meaningful Use and similar initiatives on individual healthcare.
- Innovative Apps for chronic disease management and fitness/wellness.
- Methodologies, models, and frameworks to support mobile health management.
- Mobile and ambient solutions to manage epidemics, pandemics, and health crises.
- Mobile solutions for healthcare professionals and consumers
- Online social networks for self-care and healthcare information exchange.
- Public health initiatives to foster information exchange and enhance community health.
- Regulatory, privacy, and security issues with mobile solutions in healthcare.
- Self-management and self-quantifying technologies to assist fitness and wellness.
- Wearable technologies and personal devices for health/wellness

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Technologies for Clinical Decision-Making, Interventions, and Wellness Minitrack

Technological interventions to enhance wellness are evolving quickly. Consumers and practitioners alike are incorporating mobile devices and Websites into their daily routines in new ways. The potential impact for mHealth and Web is enormous; an individual might spend 15 minutes or less per year with a primary-care physician, whereas the same person may have nearly constant contact with a mobile device, and Web contact several times a day.

Web and mobile health interventions can strengthen the connection between healthcare providers and health consumers and can monitor behavior and enable access to information and assistance. Although thousands of apps and websites present a path to significant health improvements, often in areas of critical health concern, users also can use technologies to enhance personal wellness.

An important aspect in development and refinement of these approaches is the need for an evidence base of scientific data and established care guidelines. Few apps, websites, and technology-based interventions are tested for efficacy, effectiveness, or meaningful outcomes. By not drawing on an evidence base, these approaches leave healthcare professionals and consumers vulnerable to unproven methods, as well as crowding out potentially useful novel approaches.

There is a need for consumer health applications that are evaluated with rigor to bring about meaningful change to the way health care is delivered. A parallel need exists for methods of evaluation across the design, development, and implementation continuum for interfaces that do not hamper innovation and take into account the fast pace of technological change.

The objective of this minitrack is to address these challenges by soliciting completed research papers covering novel methodological, conceptual, and design research studies involving technologies to develop and test clinical interventions and wellness applications. Preference is given to approaches that: (1) evaluate design, development, and implementation of health and wellness interventions; (2) assess the impact on patients, health care providers, healthcare organizations, and regulatory processes; and (3) develop theories and models for these systems.

This minitrack incorporates the following issues:

- Evaluation of Internet- and mobile-based applications to enhance clinical decision-making
- Evaluation of applications and interventions to enhance wellness
- Methodologies for incorporating an evidence base
- Novel approaches to studying these applications
- Alternatives to standard randomized clinical trials
- Defining meaningful outcomes
- Applying clinical care guidelines
- Gathering and using data
- Broadening the evidence base with multidisciplinary involvement
- Expanding technology
- Exploring usability and design features
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Technologies for Healthy Aging Minitrack

As society and technology advance, there is a growing interest in adding intelligence to our living, working, and social environments. Due primarily to the population’s aging, the number of individuals unable to live independently in their homes because of cognitive and physical limitations is rising rapidly. Researchers are now beginning to recognize the importance of developing new technologies to assist with health assessment and interventions for these special needs populations. According to the Secretary of State for Health, the possibilities for using technology to assist people with special needs are “extraordinary.”

Although the need for health-assistive technologies is abundant, individuals who are cross-trained in healthcare and in technology design are not. Today’s medical program graduates are largely unaware of the assistance that technology can provide and engineers are often blind to the needs of the individuals that can potentially benefit most from the technology. The National Academy of Engineering and the Institute of Medicine recognize a need for a closer partnership to span the gap between these disciplines.

Into this gap enters gerontechnology, a field that focuses on the design of technology to understand and support healthy aging. This is a multidisciplinary area that spans computer science and engineering, electrical engineering, biomedical engineering, medicine, publish health, and psychology. Because we are increasingly aware of the aging population and fueled by advances in pervasive computing and machine learning, this field has recently attracted a large number of researchers.

We invite papers that focus on, but not limited to:

- Telehealth and telemedicine
- Social network support for older adults
- Mobility and rehabilitation technologies
- Pervasive health monitoring and assessment
- Engineering health interventions
- Social care robots
- Engineering compensatory strategies
- Exercise and fitness technologies
- Assistive technologies and devices
- Designing interfaces for older adults
- Gerontechnology curriculum development and delivery

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User Experience Design for Health and Wellness Minitrack

Smartphones and a vast array of new wearable devices are empowering patients and bringing a fundamental shift in the health monitoring and decision making process, putting the consumers (patients) in charge. A recent review by cardiologist and Medscape editor Eric Topol captures the dramatic impact of this shift: (Your Smartphone will See you Now, Wall Street Journal, January 11, 2015).

However, today’s consumers are less impressed by basic usability and functionality, and they demand outstanding user experiences. The growing shift in demand for positive experiences creates a pressing need for innovation in user experience design (UXD) for health and wellness products and services. Designing positive experiences is not only essential for adoption of health and wellness products, but also it is crucial in influencing behaviors, which in turn can lead to desirable health outcomes. Examination of healthcare IT systems through HCI/Usability lens provides opportunities for both HCI and consumer health informatics researchers to formulate new theories and practices, and develop new successful technologies.

This minitrack provides a focused outlet for user experience design in health and wellness domain. We welcome any work that focuses on designing and applying engaging and effective experiences for their intended users (health consumers, medical professionals, and others) using various methodologies (design science, qualitative, and quantitative work) from both industry and academia.

Broad categories of suitable papers will include:

- analysis, design, development, and evaluation of engaging and effective user experiences for health and wellness technologies through variety of equipment such as wearable, mobile or hand held devices, robots, gaming consoles.
- wellness self-monitoring and management systems
- home health care devices and applications
- management tools chronic care
- social media application (e.g., peer support, information acquisition)
- diagnostic tools
- fitness and exercise applications
- personal health record (PHR) applications
- patient care monitoring systems
- media and devices to better enable communication between doctor and patient
- telemedicine devices
- medical knowledge management systems
- systems assisting patients in self-management, maintaining safety, and communicating with medical professionals
- online information sources such as WebMD
- preventive care systems
- Interaction issues in new technologies to empower and inform health care for consumers
- Interaction issues in navigating the wealth of health information on the Internet
- HCI issues in using health technologies across cultures or geographic regions
The best, completed research papers from the mini-track will be fast-tracked for publication consideration in the AIS Transaction on Human Computer Interaction (THCI) - http://aisel.aisnet.org/thci.

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