DAAP on Aging

The Collaboration Network
Big Quarterly Meeting
January 17, 2019

Dr. Christopher Auffrey, Urban Planning/Urban Studies (not present)
Dr. Pravin Bhiwapurkar, Architecture
Dr. Claudia Rebola, Industrial Design
Matthew Wizinsky, Communication Design
**DAAP on Aging**

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Aging Related Research in the School of Planning

Professor Chris Auffrey has co-authored the fourth (2004) and fifth (2013) editions of the *Social Areas of Cincinnati* (with Michael Malone), containing a chapter in each devoted to detailing the changing relative demographic status of “The Elderly and Children” across Cincinnati neighborhoods and the Greater Cincinnati metropolitan area from 1970 to 2009.

Plans are underway for the publication of the sixth edition in 2022 or 2023.
Aging Related Research in the School of Planning (cont.)

The *Social Areas of Cincinnat i* documents growing aging populations in parts of Cincinnati, especially in neighborhoods with lower relative socioeconomic status.

As a guide for planning aging-related services and infrastructure, the finding provide specific census tract-level detail about the locations, numbers and trends of aging in Cincinnati and the region.

This work, in part, also has supported completed dissertation research by Jongwoong Kim titled *Creating Aging-Friendly Cities and Communities in the U.S.: A Case Study of Cincinnati and Its Suburban Multifamily Communities* (2017).
Architecture: Dr. Pravin Bhiwapurkar

Areas of expertise
- Thermal comfort in indoor and outdoor environments
- Overheating and health
- Building energy efficiency
- Systems approach
- Design and health

Relevance
- There is a strong co-relation between overheating and aging population, especially during extreme heat events

Applications
- Design of smart environments
- Retrofitting existing housing (with elderly)
Fig. 1 Thermal manikin with 17 individually controlled (heating and measuring) zones: 1-Head 2-Chest 3-Stomach 4-Back 5-Buttocks 6-Right upper arm 7-Right lower arm 8-Right hand 9-Left upper arm 10-Left lower arm 11-Left hand 12-Right thigh 13-Left thigh 14-Right foot 15-Left thigh 16-Left leg 17-Left foot.

Fig. 2 A subject wearing the phase change materials (PCM) cooling vest on top of a T-shirt and instrumented with skin and rectal temperature sensors working with a personal computer at $T_a = 34^\circ C$, $RH = 60\%$, and $v_a = 0.4$ m/s.
Review

Smart Homes for Elderly Healthcare—Recent Advances and Research Challenges

Sumit Majumder 1, Emad Aghayi 2, Moein Noferesti 2, Hamidreza Memarzadeh-Tehran 2, Tapas Mondal 3, Zhibo Pang 4 and M. Jamal Deen 1,5, *

Abstract: Advancements in medical science and technology, medicine and public health coupled with increased consciousness about nutrition and environmental and personal hygiene have paved the way for the dramatic increase in life expectancy globally in the past several decades. However, increased life expectancy has given rise to an increasing aging population, thus jeopardizing the socio-economic structure of many countries in terms of costs associated with elderly healthcare and wellbeing. In order to cope with the growing need for elderly healthcare services, it is essential to develop affordable, unobtrusive and easy-to-use healthcare solutions. Smart homes, which incorporate environmental and wearable medical sensors, actuators, and modern communication and information technologies, can enable continuous and remote monitoring of elderly health and wellbeing at a low cost. Smart homes may allow the elderly to stay in their comfortable home environments instead of expensive and limited healthcare facilities. Healthcare personnel can also keep track of the overall health condition of the elderly in real-time and provide feedback and support from distant facilities. In this paper, we have presented a comprehensive review on the state-of-the-art research and development in smart home based remote healthcare technologies.

Keywords: smart home; telemedicine; telehealth; health monitoring; aged people; smart care; gerontechnology
Monitors Your Activity Level
Design: Dr. Claudia Rebola

My work brings together design, science, and technology to experiment, design and prototype **innovative interactive products** in the realm of health.

My main research is on **design for aging** with focused areas on disability, health, technologies and robotics.

I apply **universal design, social innovation and participatory/co-design methods** in designing products, from wearables to user experiences, tailored to the older adult population.

My work is **highly multidisciplinary and community-based** advancing design thinking, methods and processes for conceptualization, fabrication and deployment of graphic, interface and product designs.
what is the next-generation robotic intelligence that provides psycho-social support for older adults?
Next Generation Robotic Intelligence that Provides Psycho-Social Support for Older Adults
Role: Co-PI
Amount Funded: $999,803
Sponsor: NSF
Dates: 08/2017-07/2020
Description: Partnership with Brown U. Hasbro, Butler Hospital and UC to "redesign" the robotic cat companion "joy for all" to give higher (more meaningful) health care support.
How can we train the next generation of designers to better design technologies for older adults?
what are the potential of technologies to empower daily living of older adults?
Connecting with local communities - applied design thinking approach - designing engagement

what are the potential of technologies to empower daily living of older adults?
How can we design data collection tools to better understand older adults?
How to design a utilitarian, embracing, integrated, attractive and comfortable hip protector as a tool for fall prevention?
Smart Environmental Prosthetics (NSF SCH)

A suite of personal and domestic design products to improve the quality of life for aging populations. (Rebola, Kubley, Wizinsky)

Human Scale (wearables)
Domestic Scale (products/furniture)
Small Urban Scale (social connectivity)

Fashion/Textile Design
+ Industrial/Product Design
+ Communication/Interaction Design
+ Architecture (?)

NSF Smart + Connected Health (SCH)
Due: Dec 2019. Support up to $300k / 4 years

DAAP + 1819: Research, Design, Test, Showcase

Other Collaborators:
Gerontology, Nursing, Community Medicine … ?
Technology + Manufacturing partners … ?