# Invited Talks at the AAAI Symposium on Well-Being Computing

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**Abstract**

This paper contains abstracts of the invited talks presented at the AAAI 2016 Symposium on Well-Being Computing.

## Computing, Mental Health and Wellbeing

*Rafael Calvo*

There is increased awareness amongst computing professionals that the tools we build have an impact on people's psychological wellbeing and mental health.

AI has generally focused on improving productivity and therefore wealth, but more recently, more humanistic variables are beginning to be taken into account. Can AI be used to understand what drives human emotion? Can we integrate it into systems that promote empathy and compassion? These and other determinants of psychological wellbeing are being used to promote flourishing as part of what we call Positive Computing. But when it comes to psychological wellness, AI is having an impact beyond promotion. For example, it has already been shown to be valuable for risk detection and even treatment of mental illness. Take, for example, new systems that leverage Natural Language Processing and AI to detect depression and anxiety from social media data.

In this seminar I will discuss projects underway in our research lab and across the field that cover the spectrum of AI innovation for psychological wellbeing.

## The Autism Glass Project

*Nick Haber and Catalin Voss*

Many on the autism spectrum struggle to recognize basic facial emotions, which make social interactions and developing friendships even more difficult to sustain. Gaining these skills requires intensive behavioral interventions that are often expensive, difficult to access, and inconsistently administered. The standard cognitive behavioral therapy for expression recognition is essentially flash cards: painstaking memorization of pictures or cartoons. This both fails to expose the patient to the full variance of expressions and teaches the skill out of the real-time conversational context in which it is useful. We have developed an artificial intelligence system for automatic facial expression recognition that runs on Google Glass. The system recognizes facial expressions in others using the outward camera and delivers real-time social cues to the wearer. In this talk we discuss technical aspects of the expression recognition system, how we intend it to be used as a therapy, and the currently ongoing study for testing its efficacy. This system represents a general paradigm of automatic behavioral intervention deployed to the home which doubles as a data collection tool useful to scientists, clinicians, and patients, and we will touch on possible future directions of this research.

## Mobile Cognitive Healthcare Using and AI

*Michael Nova MD, Ph.D*

Every two years, the world's database information doubles, and every three years medical information also doubles. By 2020, global healthcare data will double every three days, with 80% of the data being unstructured, or not in tabular form.

In general, medicine – and "precision medicine" – is a big data and systems problem, especially with many different types of healthcare information such as lab results, BMI or heart rate, genetic tests, wearables, and insurance information needing to be collected and intelligently codified on an individual user basis. However, data is worthless unless it can be analyzed and acted on. To truly personalize medicine, this healthcare data needs to translate into accurate and actionable recommendations for both patients and physicians. The same applies to individuals, with respect to the personalization of their general health and wellness.

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The use of Cognitive Computing and artificial intelligence (A.I.) that can automatically read and collate unstructured data, and then dynamically learn to make personalized recommendations could dramatically impact healthcare. OME™ is a mobile consumer general health and wellness application that uses a Pathway A.I. and Cognitive Computing (IBM Watson), with genetic testing and other personal user information. OME™ collects and manages any type of personal health data (genetic tests, lab data, or wearable information) and dynamically delivers important personalized information to the user or physician.

## Deep-Learning and AI Applied to Health Informatics from Wearable Device

*Dennis Salins, Michael Snyder*

As part of the Integrated Personal Omic's Profile project (iPoP) we are studying the longitudinal in-depth biological and molecular health of patients. We have researched and gathered a handful of various wearable devices which contain sensors and counters that range from heart-rate to ECG. These devices allow the wearers to quantify their daily lifestyle, steps, heart-rate variability. During the duration of the study we are generating massive (GB's) of data for the wearer and from the data collected we are developing algorithms and finding markers about healthy lifestyles and also precursors of illnesses. We have developed a process and system that collects the data, normalizes and ingests data, and some scripts on digesting and visualizing the data.

## Defining the Forms of Autism through Big Data

*Dennis P. Wall*

Autism has exploded in rate and now impacts 1 in 50 US children. There is an urgent need to properly classify these children and to launch them onto sustainable therapy programs. Both suffer from a dramatic imbalance in the number of clinical practitioners and the number of children in need. We have begun to source these resource gaps with machine learning tools aimed at rapid mobile detection and wearable therapy programs that all can operate outside of clinical settings. In this talk, I will describe our work to date and its efficacy in studies both in the more traditional clinical environment as well as in the homes of the families managing autism.