

ipal
Image & Pervasive Access Lab

Imageneering for Healthcare and Wellbeing

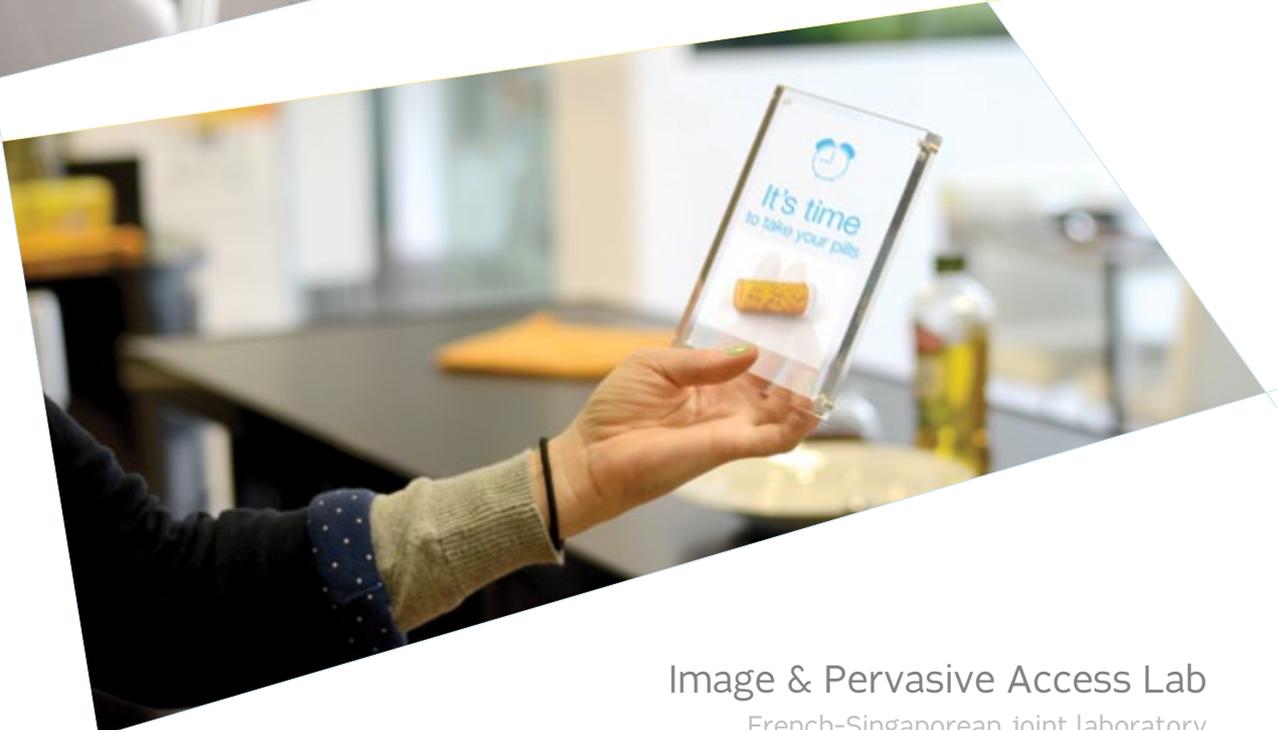


Image & Pervasive Access Lab
French-Singaporean joint laboratory
CNRS UMI 2955

About IPAL

IPAL researchers focus on cognitive approaches to both biomedical image understanding (BMIU) and pervasive access & well-being management (PAWM). The BMIU axis proposes a cognitive and pervasive medical image exploration for biomedical prognosis and treatment. PAWM axis aims at providing innovative services related to chronic disabilities and ageing.



The global framework is related to pervasive access to information, involving symbolic cognitive algorithms for vision and ambient intelligence, to enable the generation of new knowledge and associated services. The application domains span from healthcare to wellness, e.g. biomedical prognosis and ambient assistance. Strong collaborations with Singaporean/ASEAN

and French/European hospitals and companies are already in place. These linkages will be strengthened in the future, in order to increase the impact of IPAL's research outcomes, to open up more intellectual property creation opportunities and to support our collaborators in their effort to the market and to the patients and other users.

Scientists worldwide are welcome to join our challenges!

IPAL provides great opportunities to researchers and students from all around the world who desire to grow professionally in an international research laboratory. We welcome candidates in a unique environment where they will develop their research skills in top-ranked universities, supervised by distinguished researchers from Singapore and France. Our challenging projects and multi-cultural setting will enhance your career in a fun and enriching environment.



CNRS and Universities mobility

Research fellows may take a look at the CNRS website to get information about mobility with CNRS. Kindly contact us to prepare your research project.

Post-Doctorate positions

Post-Doc positions are frequently available for specific projects or to reinforce our core competencies. Open positions are listed on our website.

PhD Scholarships

We are regularly launching PhD projects, some of which may initiate emergent collaborations with our industrial and academic partners. Open positions are listed on our website.

Master Internships

Each year IPAL offers internship opportunities to young graduate students. During the internship program you will work closely with a mentor on one of our current projects. Open positions are listed on our website.



Singapore, a high-tech and world-class scientific environment.

In a very competitive scientific environment, surrounded by dynamic and talented scientists and supported by one of the best basic and translational research infrastructures worldwide, working in Singapore is a valuable experience.

In partnership with the National University of Singapore and the Agency for Science, Technology and Research, world-class scientists from all major scientific centres in the world exchange and share with us all year long, generating a prolific scientific osmosis.

Information: www.ipal.cnrs.fr/open-positions

Contact: contact@ipal.cnrs.fr

BMIU

Biomedical Image Understanding

The scope of BMIU research axis is to elaborate an effective cognitive and pervasive biomedical image exploration paradigm for biomedical prognosis and medical treatment assistance. BMIU includes cognitive vision, pervasive access, system biology and human-machine confluence.

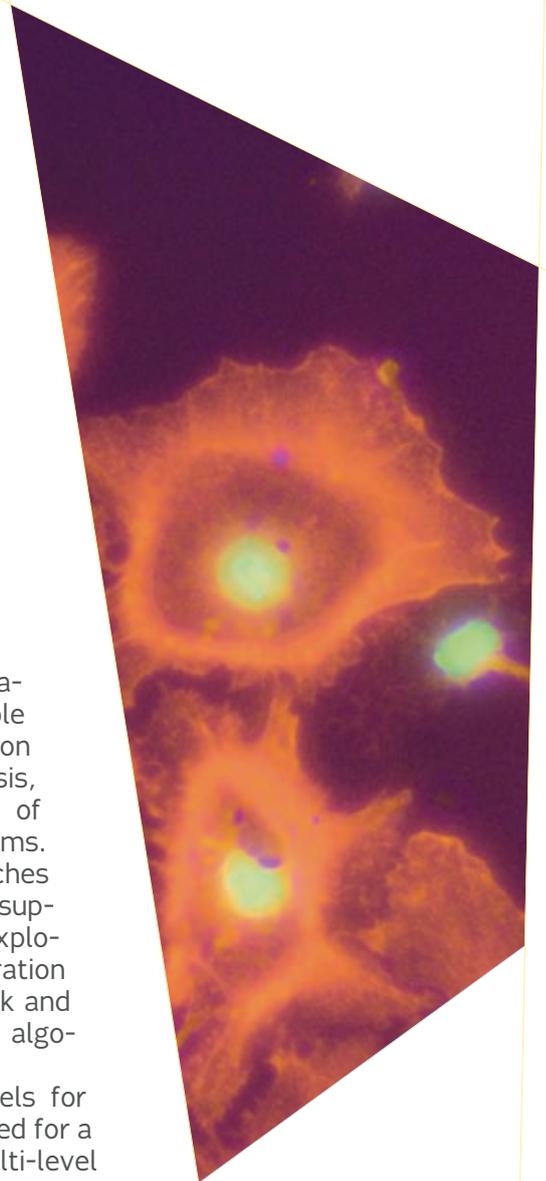
Challenges

High-content, high-throughput biomedical imaging is a tremendously important area in modern biomedical research. In order to facilitate easily configurable translational approaches and to narrow the well-known content-based image retrieval gaps (content, features, performance and usability), our team focuses on cognitive vision paradigms for medical image exploration, by integrating pervasive approaches and prior knowledge learning techniques.

Biomedical trans-modalities and multi-scale exploration are used to establish the basis of data mining processes, providing a real knowledge discovery to the physicians. The use of biomedical

ontologies and visual reasoning allows traceable and reliable second opinion for medical image analysis, a major ethical request of modern prognosis systems. Visual reasoning approaches are developed in order to support the medical image exploration and allow the integration of the biomedical feedback and validation in the analysis algorithms.

Finally, research on models for system biology is conducted for a long-term objective of multi-level analysis, using physical, physiological and biochemical data, in order to complement the imaging biomarker.



cognitive vision
traceability
biomedical information access
biomedical information fusion
cognitive biomedical image
prognosis
visual reasoning
multi-scale
pervasive exploration of biomedical images
trans-modalities
system biology
biomedical ontologies for image interpretation

PAWM

Pervasive Access and Wellbeing Management

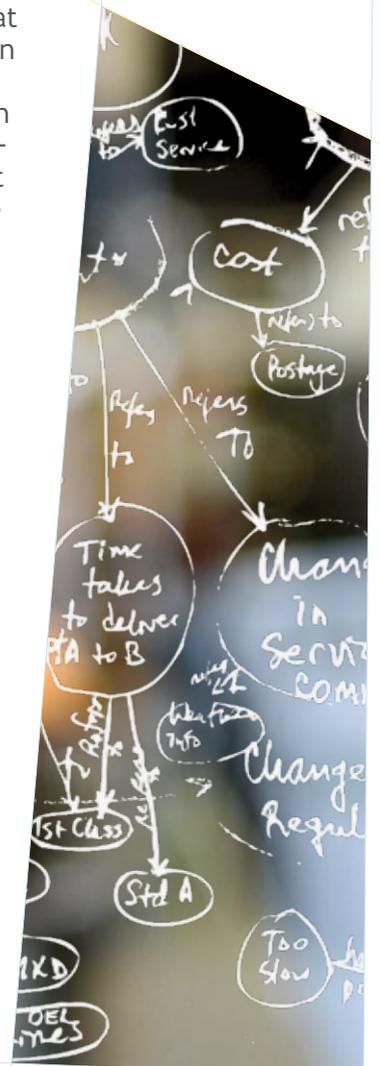
Leveraging the transition towards ubiquitous environments where embedded computing devices seamlessly integrate to serve human needs, we can design systems specially fitted to provide care to the elderly and other dependent populations. There is indeed no reason for them to miss out on the benefits of such technologies, which can help them remain independent, socially active and increase their mobility and safety.

Challenges

As stated in the World Alzheimer Report 2009, the number of people affected by dementia was estimated to 35.6 million people in 2010 and the numbers are nearly doubling every 20 years. Ambient Assistive Living consists of a set of ubiquitous technologies embedded in a living space to provide pervasive access to context-aware assistive services. It can for example enhance ageing in place by helping elderly people with their daily activities. PAWM focuses on proposing a modular, interoperable and easily deployable platform for ambient intelligence and more specifically context-awareness. The integration of modules in the platform relies on a common model and vocabulary, describing in a multi-facetted, parametric and declarative

way the act of assistance in smart spaces. This semantic representation also provides ground to implement the context-awareness in the platform, using description logic rules to perform sensor fusion, context understanding and service selection. Other artificial intelligence algorithms are used as well, however we envision that semantic inference should remain the intelligence at the helm. Our multidisciplinary research vision tackles other topics like user profile and behaviour modelling, event and service management, service semantic and continuity, user interface plasticity and multi-modal interaction as well as reasoning uncertainty.

wireless sensor network
semantic web cognitive memory assistance
context modelling
context-awareness semantic reasoning
ambient assisted living
inference engines
multi-modal interaction
pervasive access to information



Our Supporting Institutes

On Singapore's side



The Institute for Infocomm Research is a member of the Agency for Science, Technology and Research (A*STAR) family. Established in 2002, it aims to be the globally preferred source of innovations in "Interactive Secured Information, Content and Services Anytime Anywhere" through research by passionate people dedicated to Singapore's economic success.



A leading global university centred in Asia, the National University of Singapore offers a global approach to education and research, with a focus on Asian perspectives and expertise. A research-intensive university with an entrepreneurial dimension, NUS is ranked consistently as one of the world's top universities.



On France's side

The French National Centre for Scientific Research is a government-funded research organisation, under the administrative authority of France's Ministry of Research. Leading researchers worked at one time or another in their career in laboratories of the CNRS. With 17 Nobel laureates and 11 Fields Medals, the CNRS has a long tradition of excellence.



The Pierre and Marie Curie University, member of Sorbonne Universities in Paris, was established in 1971 and is the largest scientific and medical complex in France. With over 125 laboratories, most of which are associated with the CNRS, several rankings put UPMC at the first place in France and as one of the top universities in the world.



The Institut Mines-Télécom forms the first group of engineering and business schools in France, making it a key player in higher education, research and innovation. Its research domains span a large spectrum of knowledge in engineering, digital technology, economic and social sciences as well as in management.



Joseph Fourier University is a French university focusing on the fields of sciences, technologies and health, and famous for its commitment to fundamental and applied research as well as innovation. With 50 laboratories, the UJF is developing outstanding research in partnership with international research bodies.

