# GAY L. Simon

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## EDUCATION AND TRAINING

2014 : PhD in Computer Science of *Université Claude Bernard Lyon 1* (*InfoMaths doctoral school*).

2010 : Engineer in Computer Science and Applied Mathematics of ENSEEIHT, Toulouse.

2010 : Master *Recherche Informatique et Télécommunication SIGL* (*Systèmes Informatiques et Génie Logiciel*), ENSEEIHT, Toulouse.

2007-2010 ENSEEIHT, Toulouse.
École Nationale Supérieure d'Électrotechnique, d'Électronique, d'Informatique, d'Hydraulique et de Télécommunication de Toulouse.
Student in the Computer Science and Applied Mathematics, master SIGL.

## PROFESSIONAL EXPERIENCE

**06/2017 – , Post-Doc at LITIS laboratory (06/2017-02/2019 and 11/2019-), teaching (03/2019-08/2019), University of Rouen Normandy**
-*Teaching*: (2017-18 : 54H eq TD, 2018-19 : 192H eq TD, 2019-20 : 54H eq TD)
Licence : architecture and assembling language (TD, TP), FPGA programming, microcontroller programming (Arduino), introduction to electronics, sensors and actuators, (CM, TP, TD), web technologies (CM, TP).
M1-M2 : Computer Vision (TP in English), mobile computer science engineering (master Systèmes Intelligents Embarqués, TP).
L3-M1-M2 : co-supervision of student TER projects (research and teaching works) (wearable biomedical devices).
Introduction seminar to modeling, animation and simulation software *Blender* for the physics department of the University.
- *Researches (team STI, group Perception & movement)*:
conception and development of assistive device for visually impaired people, part of international projects ACCESSPACE (FR, UK, MX) and NAV-VIR (FR-PL), and national project CNRS TÉTMOST and *Guide Muséal* ;
• Partially bio-inspired localization models (hippocampus and place cells), tested on artificial agents, then human participants (haptic devices for space integration).
• Conception of virtual environments for learning, training and rehabilitation of space perception for visually impaired people and spatial neglect.
• Conception and development of a prototype of haptic tablet based on force feedback principle (F2T) as an assistive device for space perception (projet ACCESSPACE) and accessibility to images and pictorial art for visually impaired people (Guide Muséal project).

**09/2019 Teaching at Université Catholique de Lyon**
-*Teaching*: intensive programming week, ESDES students of UCLy (business students). introduction to networks and web languages (network architectures, HTML, CSS, JavaScript, CM 20H)

**09/2015 – 08/2016 ATER, Université de Lyon** (IUT, *Techniques de Commercialisation* dept.)
-*Teaching* : computer science (office softwares, databases, introduction to HTML language and networks, CM and TD, 175,5 H eq. TD)
Supervision of 8 students during their internships.
-*Researches (team TWEAK)* : development of artificial agents that can modify their environments to construct affordances, with no *a priori* notion of space nor knowledge on elements and properties of the environment. Development of learning mechanisms for a continual decision cycle, in order to prepare the use of these mechanisms on robots interacting with a real environment.

**10/2014 – 08/2015 ATER, INSA de Lyon** (Computer science dept., first cycle)

    *-Teaching* : computer science (linux, shell, bases of operating systems, microcontroller architecture and programming, multi-task programming (in C), TD, TP and TP-projects), 3$^{rd}$ and 4$^{th}$ year students (bac+3 and bac+4), 177 H eq. TD.

    *-Researches (team TWEAK)*: improvements of model developed during my PhD. Autonomous learning mechanisms in dynamic environment allowing an artificial agent to behave and interact in an environment populated with mobile elements

**07/2011 – 12/2014 PhD at LIRIS Laboratory (*Université Lyon1*), team SILEX.**

    *Title : Mécanismes d'apprentissage développemental et intrinsèquement motivés en intelligence artificielle : étude des mécanismes d'intégration de l'espace environnemental.*

(http://liris.cnrs.fr/publis/?id=7032, supervised by Alain Mille and Olivier Georgeon, defense: December 15$^{th}$ 2014) The aim of my PhD consisted to give to an artificial agent the ability to perceive, memorize and interpret its surrounding environment according to its interaction with the environment, without using *a priori* knowledge about the environment or the sensorimotor possibilities of the agent.

The aim of my PhD consisted to give to an artificial agent the ability to perceive, memorize and interpret its surrounding environment according to its interaction with the environment, without using *a priori* knowledge about the environment or the sensorimotor possibilities of the agent. I proposed a theoretical model based on the sensorimotor contingency that implements a form of intrinsic motivation and enables the agent generating exploitable knowledge of elements populating its environment and a structure characterizing space. This model begins with a set of indivisible structures called interactions, that characterize exchanges between the agent and its environment. The knowledge learning process is developmental and emerges from the interaction between the agent and the environment, without the need of any external intervention. This model was tested both on artificial agents and on robotic platforms.(http://pagesperso.litislab.fr/~sgay/index.php?page=these)

**04/2010 – 09/2010 Internship at AI Lab (Zurich).**

    Supervised by Hugo Gravato Marquès (Third year internship of ENSEEIHT).

    *Title : Developmental robotics: towards the development of a body image and tool use. Visual identification of parts of the body of ECCERobot Robot. Development of a segmentation and tracking algorithm based on movement.* Used on *ECCERobot*, this mechanism allows to separate mobile elements that are parts of the body of the robot from other elements, by comparing motor commands and observed movements.

**07/2009 – 08/2009 Internship in ISIR Laboratory (Sorbonne University).**

    Supervised by Christophe Grand, implementation of the middleware part of Psikharpax rat-robot, using *ROS* (Robotics Operating System).

**2006-2007 TIPE of second year of preparatory classes for high school,** development and implementation of a rudimentary astrocyt-neuronal network on a mobile robot.

## RECENT PUBLICATIONS (2015-2019)

**International revues :**

– Simon L. Gay, Alain Mille, Olivier L. Georgeon, and Alain Dutech. *Autonomous construction and exploitation of a spatial memory by a self-motivated agent.* Cognitive Systems Research, Vol. 41, pp. 1-35, mars 2017,

**Conferences :**

– Pierre Ancet, Chottin Marion, Gay Simon, Rivière Marc-Aurèle, Roméo Katerine, Pissaloux Edwige, Thompson Hannah. TETMOST: accessibility to art for visually impaired people. Interreg Channel Research Day, 2019 (poster).

– Marc-Aurèle Rivière, Simon L. Gay, Katerine Romeo, Edwige Pissaloux, Michal Bujacz, Piotr Skulimowski, Pawel Strumillo, *NAV-VIR: An Audio-Tactile Virtual Environment to Assist Visually Impaired People*, 9th International IEEE/EMBS Conference on Neural Engineering (NER), 2019, pp 1038-1041.

– Simon L. Gay, Marc-Aurèle Rivière, and Edwige Pissaloux. *Toward a Haptic Surface Devices with Force Feedback for Visually Impaired People.* 16th International Conference on Computers Helping People with Special Needs (ICCHP) 2018, pp 258-266.

– Marc-Aurèle Rivière, Simon L. Gay, and Edwige Pissaloux. *TactiBelt: integrating spatial cognition and mobility theories into the design of a novel orientation and mobility assistive device for the blind.* 16th International Conference on Computers Helping People with Special Needs (ICCHP) 2018, pp 110-113.

– Romeo K., Toussain I., Rivière M.-A., Gay S., Velasquèz R., Pissaloux E., Chottin M., Ancet P. Vers une aide à la mobilité basée sur la connaissance de l'espace pour les personnes ayant une déficience visuelle. HANDICAP 2018, pp 73-79.

– Ancet P., Chottin M., Pissaloux E., Romeo K., Rivière M.-A., and Gay S. L., *Toucher ou être touché : les vertus inclusives du mouvement et de la sensibilité tactile.* Workshop, Défi AUTON, CNRS, 2018 (poster).

– Simon L. Gay, Alain Mille, and Amélie Cordier. *Autonomous object modeling and exploiting: a new approach based on affordances from continual interaction with environment.* IEEE Seventh Joint International Conference on Development and Learning and on Epigenetic Robotics, 2017, pp 362-367.

– Simon L. Gay, Alain Mille, and Amélie Cordier. *Autonomous affordance construction without planning for environment-agnostic agents*. IEEE Sixth Joint International Conference on Development and Learning and on Epigenetic Robotics, 2016, doi : 10.1109/DEVLRN.2016.7846800.

– Olivier Georgeon, Alain Mille, et Simon Gay. *Agents artificiels sans accès ontologique à la réalité : vers une intégration des théories incarnées, constructivistes, énactivistes, et de la philosophie de l'esprit*. Intellectica, Vol. 65, 2016.

– Simon L. Gay and Salima Hassas. *Autonomous object modeling based on affordances in a dynamic environment*, Biologically Inspired Cognitive Architectures, 2015.

**others :**

– Ancet, P., Chottin, M., Gay, S., Pissaloux, E., Rivière M-A., Romeo K., Thomason, H., "TETMOST : vers un guide muséal inclusif", Channel Days, 19 Mars 2019, Caen

– Simon L. Gay et Marc-Aurèle Rivière, *Etat de l'art sur les dispositifs à stimulation tactile,* Journée Nat. TETMOST, CNRS, 30-31st october 2017

– S. L. Gay, E. Pissaloux, M.-A. Rivière, *ForFeeTa (F2T) : une tablette tactile et haptique à retour de force*, **enveloppe Soleau**, submitted at Université de Rouen Normandie, 08/02/2018.

Publications where I am first author are available here: http://pagesperso.litislab.fr/~sgay/index.php?page=publi

## FOREIGN LANGUAGES

English: read, spoken, written (scientific level)
Japanese: beginner level.

## COMPUTER SCIENCE LANGUAGES AND SOFTWARE

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| Langages | : C, C++, java, python, VHDL, caml, PROLOG, FORTRAN, MatLab, LUSTRE, assembler PIC and 8086, RCX & NQC, Arduino, OpenCV library |
| OS | : windows, Unix and Linux |
| Softwares | : LibreOffice, Latex, Eclipse, Code::Blocks, Blender, Gimp, Inkscape |

## INTERESTS

Computer science, robotics (construction and programming, http://pagesperso.litislab.fr/~sgay/index.php?page=robot), trekking, science-fiction, retrogaming.