Swiss Federal Institute of Technology EPFL

EPFL: Swiss Federal Institute of Technology in Lausanne
Virtual Reality Laboratory
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Core Competence

Virtual Reality, Virtual and Augmented Environments, Virtual Humans, Video analysis, behavioural animation, motion control, standards, medical simulation

Head of the Institute
Daniel Thalmann

History

The Virtual Reality Lab (VRlab), formerly Computer Graphics Lab (LIG), at the Swiss Federal Institute of Technology (EPFL) in Lausanne was founded in July 1988 by its director, Professor Daniel Thalmann. The laboratory is mainly involved in the modelling and animation of Three-Dimensional Inhabited Virtual Worlds. VRlab is a world leader laboratory in real-time Virtual Humans and a key player in the area of multimodal interaction, immersive Virtual Environments, and Augmented Reality. The laboratory is currently partner in 12 European projects and 6 National projects. The lab is responsible for teaching Computer Graphics, Virtual Reality, and Computer Vision at the Diploma and the Doctoral level. VRlab is also involved in the organization of international conferences and workshops in VR, animation, and graphics.

Rooms and Locations

The Virtual Reality Lab occupies the first floor of the), the rooms and other infrastructure are financed by

IN J building in the Swiss Federal Institute of Technology (some 5000 square meters). This includes three special rooms for demo, video capture, rendering, and virtual reality research.

Staff

1 Professor: Daniel Thalmann.
1 Assistant professor: Pascal Fua
4 Senior researchers:(Ronan Boulic, Marcello Kallmann, Vincent Lepetit, Frederic Vexo)
2 Administrative people:(Josiane Bottarelli, Zerrin Celebi)
7 Designers and technical staff: Rachel Cetre, Mireille Clavien, Nicolas Elsig, Manuel Kurth Stephanie Noverraz, Olivier Renault, Christoph Widauer
27 Research assistants: Ali Shahrokni, Anderson Maciel, Anthony Guye-Vuilleme, Benoît Le Callennec, Branislav Ulicny, Bruno Herbelin, Dinh Duy LE, Dr. Amaury Aubel, Etienne De Sevin, Fatih Erol, Ik Soo Lim, Jan Ciger, Jean-Sebastien Monzani, Jose Juarez Gonzalez, Lorna Herda, Luca Vacchetti, Mario Gutierrez, Mehdi Molkaraie, Michal Ponder, Pablo De Heras Ciechomski, Pascal Glardon, Patrick Lemoine, Raquel Urtasun, Sébastien Schertenleib, Slobodan Ilic, Sofiane Sarni, Tolga Abaci.

Financing

- As a laboratory of the Swiss Federal Institute of technology the tenure academic staff and the administrative staff (5 peoples
- SNF 3D Behavioural Animation and Virtual

the Swiss Federal government. Most of the research assistants and some additional staff (designers and technicians), as well as most equipment are paid from EU pojects or the National Swiss Foundation.

Current Structure and Important Partners
VRlab, is organized in two work areas, one for virtual reality (Prof. Daniel Thalmann), computer animation, virtual humans, the second for vision (Dr. Pascal Fua), video analysis, tracking. Both subgroups work together in Augmented Reality. Among other laboratories in this field in Europe, they cooperate closely with the Miralab research laboratory located in Geneva.

Current Research
Research areas in VRlab may be separated into 6 classes:
Motion Control and the simulation of high-level behaviors based on physical laws, and captured data using magnetic sensors.
Artificial Life and Behavioral Animation, with models for autonomy and perception based on virtual sensors (vision, audition and tactile).
Shared Virtual Environments where avatars and autonomous virtual humans can meet in common virtual spaces.
Vision and Augmented Reality, to track body motion and combine real and virtual objects.
Body deformations, both for real-time and realistic medical applications.
Standards for body description and animation (VRML, MPEG-4, AML, VHML).

Important Recent Project Participations
- INTERFACE, EU-IST, Multimodal Analysis/Synthesis System for Human Interaction to Virtual and Augmented Environments
- VIRTUAL, EU-IST, Virtual Reality systems for perceived ergonomic quality testing of driving task and design
- JUST, EU-IST, Training of non professionals in Health Emergency Situations by Virtual Reality
- CAHRISMA, EU-INCOMED, Conservation of the Acoustical Heritage by the Revival and Identification of the Sinan's Mosques' Acoustics
- SONG, EU-IST, Portals of Next Generation
- WORLDS STUDIO, EU-IST, Innovative Computer Tools and Methods for Virtual 3D Environments Production
- LIFEPLUS, EU-IST, Innovative Revival in Ancient Frescos

Reality
- SNF Interactive Optimization of Mobile Articulated Structures
- NCCR CO-ME Computer-Aided and Image Guided Medical Intervention
- EPFL-UNIL PHOBIA Virtual Reality in Psychiatry
- VIBES Video Browsing, Exploration and Structuring
- CTI Golf
- EPFL Interactive Mobile Robots
- MESH, EU-IST, Modelling of Expression and Shape of human Heads
- MELIES, EU-IST, Modelling Equipment for Live Interactive Electronic Streaming
- STAR, EU-IST, Service Training through Augmented Reality
- SNF Realistic Modeling of Humans from Video Sequences
- SNF Augmented Reality

Important Recent Industrial Partners
Actisystem, Androme, Arax, Archetypon, Art & Magic, BoostWorks, British Telecom, Broadview.tv, Canal+ Belgium, Canon Research Lab, Central Scotland Police, Centro Richerche Fiat, CGS S.a.s., CryoNetwork, Deltatec, Deutsche Telekom, Division Ltd, Duran, Elan Informatique, Eyetronics Forschungszentrum Informationstechnik GmbH France Télécom, Illuminations Television Ltd. Imagination In Motion, Integrated Information Systems Ltd, Interactive Labs S.r.l., ISTAR Karl Storz GmbH Co, EADS, Memondo Graphics, Medical Research Ltd, Modis S.p.A. Network Consulting Group S.r.l., PDG and Partners, Philips LEP, Philips Research Lab, Plan_b, Pragma Engineering S.r.l., RTL-Productions, Siemens Aktiengesellschaft, Siemens Corporate Research and Development, Signo Motus S.r.l., Silicon Graphics, SIM.CO.E S.r.l., Sociedad Andaluza para el Desarrollo de la Informatica y la Electronica S.A., Tau Scrl, Telenor AS, Telmat Informatique, Tepro Analysis S.r.l, Thomson CSF, TSD-Projects s.r.l, VPRO TV

Future of the Lab
The Laboratory will continue close cooperations with its current partners. It will intensify international cooperation. The future research areas will be developed towards interaction with realtime groups of Virtual Humans in Virtual and Augmented Reality.