

# Henri Rebecq

PhD student in Computer Vision and Robotics

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French, 26 years old  
Driving license



## Academic

- June 2015-Now **PhD student**, *ETH Zürich/University of Zürich*.  
with Prof. Davide Scaramuzza (Robotics and Perception Group)  
**Robust, Accurate, Efficient SLAM with Events, Frames, and IMU**
- 2013-2014 **M.Sc. MVA**, *École Normale Supérieure de Cachan*, Mathematics, Vision & Learning.  
**Received with highest distinction**  
Selected courses: Machine learning, Probabilistic graphical models, Discrete optimization, Kernel methods
- 2011-2014 **Télécom ParisTech**, *Paris*.  
◦ Graduate school for applied mathematics and computer science engineering  
◦ One of France's highly competitive engineering schools in the "Grandes Ecoles" system  
Selected courses: Computer vision, 3D computer graphics, Signal processing, Advanced C++  
Final project: "FLIP: an automated music page turner" written in Java. Provided with the sheet music, it is able to listen to a musician through a microphone and turn the page automatically when needed.
- 2008-2011 **Classes Préparatoires**, *Lycée Aux Lazaristes*, Lyon, France.  
Intensive preparatory course for competitive entrance into top French engineering schools
- June 2008 **French scientific baccalaureate received with highest distinction**.  
Equivalent to A level in Math, Physics and Chemistry

## Industry

- April 2014 - June 2015 **Research engineer**, *Orah*, Paris.  
◦ Designed a full pipeline for performing self-calibration of a multiple wide-angle camera system based on video streams (implemented in C++/OpenCV).  
◦ Integrated with the latest version of the software and highlighted as a key new feature.  
◦ Prototyped an algorithm for generating stereoscopic, 360 degree video panoramas.  
◦ Implemented an internal tool to perform intrinsic calibration of fisheye cameras (using Ceres Solver).

## Awards

- Qualcomm Innovation Fellowship**, 2018.  
Awarded for my proposal: *Learning Representations for Low-latency Perception with Frame and Event-based Cameras*.
- Mischa Mahowald Prize for Neuromorphic Engineering**, 2017.  
Awarded for "*pathbreaking applications of neuromorphic engineering to robot navigation*".
- Best Industry Paper**, *British Machine Vision Conference (BMVC)*, 2016.  
Awarded for my paper: *EMVS: Event-based Multi-view Stereo*.
- People's Choice Prize & Technical Prize**, *Final year project at Télécom ParisTech*, 2012.  
Awarded for my project: *FLIP: an automated music page turner*.

## Patents

- H. Rebecq, G. Gallego, D. Scaramuzza**, *Simultaneous Localization and Mapping with an Event camera*, PCT/EP2017/071331, Status: Pending. Filed on September 2, 2017.

## Publications

### Journal papers

- T. Rosinol Vidal\*, **H. Rebecq\***, T. Horstschaefter, and D. Scaramuzza, "Ultimate SLAM? combining events, images, and IMU for robust visual SLAM in HDR and high speed scenarios," *IEEE Robot. Autom. Lett.*, 2018, (equal contribution).
- H. Rebecq**, G. Gallego, E. Mueggler, and D. Scaramuzza, "EMVS: Event-based multi-view stereo - 3D

reconstruction with an event camera in real-time," *Int. J. Comput. Vis.*, 2017.

G. Gallego, J. Lund, E. Mueggler, **H. Rebecq**, T. Delbruck, and D. Scaramuzza, "Event-based, 6-DOF camera tracking for high-speed applications," *IEEE Trans. Pattern Anal. Machine Intell.*, 2017.

**H. Rebecq**\*, T. Horstschäfer\*, G. Gallego, and D. Scaramuzza, "EVO: A geometric approach to event-based 6-DOF parallel tracking and mapping in real-time," *IEEE Robot. Autom. Lett.*, vol. 2, pp. 593–600, 2017, (equal contribution).

E. Mueggler, **H. Rebecq**, G. Gallego, T. Delbruck, and D. Scaramuzza, "The event-camera dataset and simulator: Event-based data for pose estimation, visual odometry, and SLAM," *Int. J. Robot. Research*, vol. 36, pp. 142–149, 2017.

E. Mueggler, G. Gallego, **H. Rebecq**, and D. Scaramuzza, "Continuous-time visual-inertial trajectory estimation with event cameras," *IEEE Trans. Robot.*, 2018.

### Conference papers

**H. Rebecq**\*, T. Horstschaefer\*, and D. Scaramuzza, "Real-time visual-inertial odometry for event cameras using keyframe-based nonlinear optimization," in *British Machine Vis. Conf. (BMVC)*, Sept. 2017, (equal contribution) **Oral presentation (acceptance rate: 5.6%)**.

**H. Rebecq**, G. Gallego, and D. Scaramuzza, "EMVS: Event-based multi-view stereo," in *British Machine Vis. Conf. (BMVC)*, Sept. 2016, **Best Industry Paper award. Oral presentation (acceptance rate: 7%)**.

Z. Zhang, **H. Rebecq**, C. Forster, and D. Scaramuzza, "Benefit of large field-of-view cameras for visual odometry," in *IEEE Int. Conf. Robot. Autom. (ICRA)*, 2016.

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## Skills

### Computer

Programming C++, Python, Java  
GPU CUDA

Scientific OpenCV, Python/NumPy  
Deep Learning Familiarity with Keras/TensorFlow

### Languages

French **Native language**  
English **Fluent**  
German **Intermediate**  
Spanish **Intermediate**

*Cambridge CAE*  
*Studied for 5 years in high school, 2 years casual speaking in Zurich*  
*Studied for 2 years, volunteer work in Mexico for 2 months*

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## Activities

Music I have been playing the piano for 20 years (preferred genres : boogie-woogie and classical music).

Video I am fond of videomontage & visual effects (using tools like Blender, Adobe Premiere, After Effects).