

# RAFFAELLO D'ANDREA<sup>1</sup>

[www.raffaello.name](http://www.raffaello.name)

## APPOINTMENTS

Founder and chairman of the board, Verity AG. **Since 2014.**  
Co-founder and advisor, Robo Global Investments and Exchange Traded Funds. **Since 2013.**  
Chief technical advisor, Kiva Systems. 2008-2012.  
Professor of dynamic systems and control, ETH Zurich. **Since 2008.**  
Co-founder and co-CTO, Kiva Systems. 2003-2007.  
Associate professor, mechanical and aerospace engineering, Cornell University. 2003 - 2007 (on leave).  
Assistant professor, mechanical and aerospace engineering, Cornell University. 1997 - 2003.

## EDUCATION

Ph.D., California Institute of Technology, Electrical Engineering. 1997.  
M.S., California Institute of Technology, Electrical Engineering. 1992.  
B.Sc., University of Toronto, Engineering Science. 1991.

## SELECT HONORS AND AWARDS

National Academy of Engineering (United States of America). 2020.  
National Inventors Hall of Fame (United States of America). 2020.  
IEEE Robotics and Automation Award. 2016.  
Engelberger Robotics Award. 2015.  
Best Paper Award, IFAC Mechatronics Journal. 2014.  
Best Paper Prize, IFAC World Congress. 2011.  
IEEE-IFR Invention and Entrepreneurship Award in Robotics and Automation. 2008.  
Excellence in Teaching Award, Cornell College of Engineering. 2005.  
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Padova, Italy. 2003.  
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Fukuoka, Japan. 2002.  
Presidential Early Career Award for Scientists and Engineers (United States of America). 2001.  
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Melbourne, Australia. 2000.  
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Stockholm, Sweden. 1999.  
Best Student Paper Award, IEEE Conference on Decision and Control. 1996.  
O. Hugo Schuck Best Paper Award, AACC American Control Conference. 1994.  
Natural Sciences and Engineering Research Council of Canada 1967 Fellow. 1991-1996.  
University of Toronto Wilson Medal. 1991.  
Valedictorian, Anderson CVI, Whitby, Canada. 1986.

## SELECT SPEAKING ENGAGEMENTS

Royal Institution of Great Britain Lecture Series, 2022.  
Swiss Robotics Day Keynote, 2022.  
AWS Swiss Cloud Day Keynote, 2022.  
Swiss Innovation Forum Keynote, 2021.  
Digitilize in Stockholm, 2020.  
USI, 2019.  
The Big Challenge Science Festival, 2019.  
CLSA Investor Forum Hong Kong, 2019.  
CLSA Investor Forum Japan, 2019.  
Nyquist Lecture, Yale University, 2018.  
Kelly Distinguished Lecture on Robots and Jobs, Georgia Tech, 2017.  
Mediterranean Conference on Control and Automation plenary, 2017.  
T-Edge Beyond The Impossible Conference, 2016.  
Seoul Future Conference, 2016.  
Glass Memorial Lecture Series, University of Toronto, 2016.  
TED, 2016.  
Indian Control Conference plenary, 2016.  
LAUNCH Distinguished Lecture Series, University of Illinois, 2015.  
Swiss Energy Climate Summit, 2015.  
USI, 2015.  
Microsoft Research Devices and Networking Summit, 2015.  
DLD, 2015.

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<sup>1</sup>September 25, 2022.

Zurich.Minds, 2014.  
 University California Santa Barbara “Engineering the Future” Lectureship, 2014.  
 Crocco Colloquium, Princeton University, 2014.  
 International Conference on Simulation, Modeling, and Programming for Autonomous Robots plenary, 2014.  
 Canadian Conference on Computer and Robot Vision plenary, 2014.  
 ACM Symposium on User Interface Software and Technology plenary, 2013.  
 Maker Faire Rome - The European Edition, 2013.  
 RoboCup International Symposium plenary, 2013.  
 Robotics Science and Systems plenary, 2013.  
 TED Global, 2013.  
 IEEE Conference on Decision and Control plenary, 2013.  
 Zurich.Minds, 2012.  
 Society for Design and Process Science plenary, 2012.  
 International Symposium on Software Engineering for Adaptive and Self-Managing Systems plenary, 2012.  
 IEEE International Conference on Robotics and Automation plenary, 2010.  
 University of Texas at Dallas Center for Values in Medicine, Science, and Technology Lecture Series, 2010.  
 DLD, 2009.  
 Dean’s Distinguished Lecture Series, Faculty of Engineering, Yale University, 2008.  
 Tetelman Lecture, Yale University, 2008.  
 International Conference on Robot Communication and Coordination plenary, 2007.  
 Conference on Cellular Automata for Research and Industry plenary, 2006.  
 ideaCity, 2006.  
 College of Engineering Distinguished Speaker Series, Rochester Institute of Technology, 2005.  
 Engineering Academy of Japan International Symposium, 2004.  
 Robot Motion Control Conference plenary, 2004.  
 Air Force Rome Laboratories Information Institute’s Frontiers in Information Sciences Distinguished Lecture Series, 2004.  
 Spoletoscienza, Spoleto Festival, 2003.  
 American Control Conference plenary, 2003.  
 SIAM Conference on Control and its Applications plenary, 2001.  
 Sigma Series Public Lecture and Colloquium, NASA Langley Research Center, 2001.  
 National Science Foundation Research Highlight Series, 2001.  
 IEEE Conference on Decision and Control plenary, 2000.

## SELECT SHOWS, EXHIBITIONS, AND DEMONSTRATIONS

### **Flying Machine Design and Choreography (with Verity Studios)**

Justin Bieber Justice World Tour. February 2022 - March 2023.  
 Céline Dion Courage Tour. November 2019 - April 2020.  
 Beyond Limits (Guinness World Record with British Telecom), London. October 2019.  
 2047 Apologue 3, Beijing. September 2019.  
 CCTV New Year’s Gala, China. January 2019.  
 Drake North American tour. July 2018 - July 2019.  
 Starlight Express, Bochum. May 2018 - present.  
 Circus Knie, Switzerland. February 2018 - July 2018.  
 Knicks pre-game show, Madison Square Garden, New York. September 2017 - May 2018.  
 Metallica Worldwired tour. October 2017 - October 2019.  
 2047 Apologue, Beijing. June 2017.  
 Cirque du Soleil’s PARAMOUR on Broadway, New York. April 2016 - April 2017.

### **Meet the Dazzling Flying Machines of the Future (with Verity Studios and IDSC<sup>2</sup>)**

TED, Vancouver, Canada. February 2016.  
 Zurich.Minds, Zurich, Switzerland. November 2014.

### **Flying Machine Arena (with IDSC)**

“Sparked”, Cirque du Soleil. September 2014.  
 TED Global, Edinburgh, Scotland. June 2013.  
 Zurich.Minds, Zurich, Switzerland. December 2012.  
 Google IO, San Francisco, USA. June 2012.  
 Hannover Messe, Hannover, Germany. April 2012.

### **Flight Assembled Architecture (with IDSC and Gramazio & Kohler)**

FRAC Centre, Orleans, France. December 2011 - February 2012.

### **Balancing Cube (with Sebastian Trimpe/IDSC)**

IFAC World Congress, Milan, Italy. August 2011.  
 Festival Della Scienza, Genoa, Italy. October 2009.  
 Nacht der Forschung, Zurich, Switzerland. September 2009.

### **Blind Juggler (with Philipp Reist/IDSC)**

Exploratorium, San Francisco, USA. November 2011.

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<sup>2</sup>Institute for Dynamic Systems and Control, ETH Zurich.

Museum for Communication, Berlin, Germany. May - September 2010.  
 Heinz Nixdorf Museum, Paderborn, Germany. November 2009 - March 2010.  
 Festival Della Scienza, Genoa, Italy. October 2009.  
 Robodays, Odense, Denmark. September 2009.  
 Nacht der Forschung, Zurich, Switzerland. September 2009.

**Robotic Chair (with Max Dean and Matt Donovan)**

Cabaret Voltaire, Zurich, Switzerland. March 2009.  
 London Art Fair, London, England. January 2009.  
 National Gallery of Canada, Ottawa, Canada. October 2008 - February 2009.  
 Ottawa Art Gallery, Ottawa, Canada. November 2008.  
 Flowers Gallery, London, England. July - August 2008.  
 Contemporary Art Gallery, Vancouver, Canada. June - August 2008.  
 Yale School of Art, Yale University, New Haven, USA. January 2008.  
 Luminato Festival, Toronto, Canada. June 2007.  
 International Contemporary Art Fair of Madrid (ARCO), Spain. February 2007.  
 Ars Electronica, Linz, Austria. September - October 2006.  
 ideaCity, Toronto, Canada. June 2006.

**Table (with Max Dean)**

National Gallery of Canada, Ottawa, Canada. October 2008 - February 2009.  
 National Gallery of Canada, Ottawa, Canada. October 2002 - February 2003.  
 Biennale di Venezia, Venice, Italy. June - October 2001.

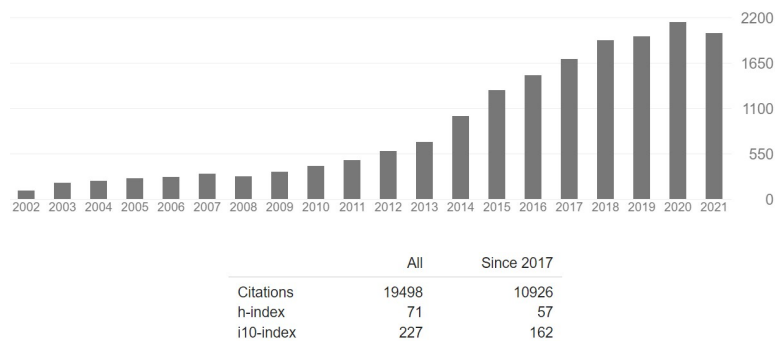
**Cornell Autonomous Robot Soccer Team**

Festival dei Due Mondi, Spoleto, Italy. July 2003.  
 Tech Museum of Innovation (now known as The Tech Interactive), San Jose, USA. January 2001.  
 Smithsonian, Washington, USA. December 1999.

**COLLECTIONS**

Changi Airport, Singapore. Robotic Chair, 2021.  
 Museum Tinguely, Basel, Switzerland. Robotic Chair, 2016.  
 FRAC Centre, Orleans, France. Flight Assembled Architecture, 2011.  
 Heinz Nixdorf Museum, Paderborn, Germany. Blind Juggler, 2009.  
 National Gallery of Canada, Ottawa, Canada. Robotic Chair, 2006.  
 National Gallery of Canada, Ottawa, Canada. Table, 2003.

**CITATIONS**



Google Scholar, September 25, 2022.

**SELECT RESEARCH GRANTS**

**PRINCIPAL INVESTIGATOR**

**Extending the Capabilities of Small Autonomous Flying Vehicles**  
 Swiss National Science Foundation.

**Approximate Model Predictive Control**  
 ETH Independent Investigator Research Award.

**Distributed Estimation and Control of Mechatronic Systems**  
 Swiss National Science Foundation.

## **Aerial Construction**

ETH Independent Investigator Research Award.

## **Control of Underactuated Systems Composed of Subsystems with Identical Dynamics**

ETH Independent Investigator Research Award.

## **High Performance Maneuvers and Trajectory Generation for Quadrotor Flying Vehicles**

Swiss National Science Foundation.

## **Optical Motion Capture System for Robot Experiments in Real World Environments**

Swiss National Science Foundation.

## **Distributed Estimation and Control of Mechatronic Systems**

Swiss National Science Foundation.

## **Design of Robust, Networked Control Systems via Convex Optimization**

US National Science Foundation.

## **Control of Vehicle Swarms**

US Air Force Office of Scientific Research, PECASE Award.

## **Control of Spatially Interconnected Systems, with Application to Coordinated Vehicle Control**

US Air Force Office of Scientific Research.

## **Robust and Optimal Control of Interconnected Systems**

US National Science Foundation.

## **Experimental Model-Based Control Design Using Multibody Codes**

US National Science Foundation.

## **Synthesis Methods for Distributed and Time Varying Controlled Systems**

US Air Force Office of Scientific Research.

## **Reduced Order Modeling and Control of Systems Subject to Fluid-Structure Interactions**

US Air Force Office of Scientific Research.

## **Mechatronics Systems Engineering Projects**

Cornell College of Engineering laboratory and personnel funds.

## **CO-PRINCIPAL INVESTIGATOR**

### **EuRoC: European Robotics Challenges**

European Research Council.

### **NCCR Digital Fabrication**

Swiss National Science Foundation.

### **RoboEarth: Robots Sharing a Knowledge Base for World Modeling and Learning of Actions**

European Research Council.

### **Layered Fault Management Architectures**

DARPA.

### **Human Centered, Variable Initiative Control of Complex Automa-Teams**

DARPA.

### **Mixed Initiative Control of Automa-Teams**

DARPA.

### **Cooperative Control in Uncertain, Adversarial Environments**

US Air Force Office of Scientific Research Multi-Disciplinary University Research Initiative.

### **High Speed and High Precision Measurement and Simulation Design Laboratory**

Cornell College of Engineering.

### **A Practical Method to Predict and Control Non-linear Aeroelasticity**

US Department of Defense.

### **Three-Axis satellite Attitude Control Using Only Magnetic Torquers**

US Air Force Office of Scientific Research.

## **MENTORING**

### **Ph.D.**

Matthias Hofer, Ph.D., ETH Zurich. 2022.

Carmelo Sferrazza, Ph.D., ETH Zurich. 2022.

Rajan Gill, Ph.D., ETH Zurich. 2020.

Anton Ledergerber, Ph.D., ETH Zurich. 2020.

Mike Hamer, Ph.D., ETH Zurich, 2019.

Dario Brescianini, Ph.D., ETH Zurich, 2018.

Michael Muehlebach, Ph.D., ETH Zurich, 2017.

Robin Ritz, Ph.D., ETH Zurich, 2017.  
Max Kriegleder, Ph.D., ETH Zurich, 2017.  
Federico Augugliaro, Ph.D., ETH Zurich, 2015.  
Mark Mueller, Ph.D., ETH Zurich, 2015.  
Philipp Reist, Ph.D., ETH Zurich, 2015.  
Gajamohan Mohanarajah, Ph.D., ETH Zurich, 2014.  
Markus Hehn, Ph.D., ETH Zurich, 2014.  
Sergei Lupashin, Ph.D., ETH Zurich, 2013.  
Raymond Oung, Ph.D., ETH Zurich, 2013.  
Sebastian Trimpe, Ph.D., ETH Zurich, 2013.  
Angela Schoellig, Ph.D., ETH Zurich, 2012.  
Michael Sherback, Ph.D., Cornell University, 2009.  
Oliver Purwin, Ph.D., Cornell University, 2008.  
Ramu Chandra, Ph.D., Cornell University, 2005.  
Jeffrey Fowler, Ph.D., Cornell University, 2005.  
Cedric Langbort, Ph.D., Cornell University, 2004.  
Matthew Earl, Ph.D., Cornell University, 2004.

### **Post-Doctoral**

Dr. Luca Gherardi. 2013 - 2014.  
Dr. Markus Waibel. 2010 - 2014.  
Dr. Michael Sherback. 2009 - 2010.  
Dr. Frederic Bourgault. 2008 - 2010.  
Dr. Guillaume Ducard. 2008 - 2009.  
Dr. Keyong Li. 2005 - 2007.  
Dr. Venkatesh Rao. 2004 - 2006.  
Dr. JinWoo Lee. 1998 - 1999, 2001 - 2006.  
Dr. Myungsoo Jun. 2001 - 2004.  
Dr. Tama's Kalma'r Nagy. 2001 - 2002.

### **High-Profile Talks**

Matthias Hofer, TEDx 2022.  
Carlo Sferazza, TEDx 2021.  
Carlo Sferazza, World.Minds 2019.  
Léa Pereyre, World.Minds 2016.  
Federico Augugliaro, TEDx 2016.  
Angela Schoellig, TEDx 2016.  
Max Kriegleder, TEDx 2015.  
Gajan Mohanarajah, TEDx 2014.  
Markus Hehn, TEDx 2014.  
Sergei Lupashin, TED 2014.  
Mark Mueller, TEDx 2014.  
Federico Augugliaro, BUILDx 2014.  
Raymond Oung and Max Kriegleder, World.Minds 2013.  
Gajan Mohanarajah, World.Minds 2013.  
Philipp Reist, World.Minds 2011.  
Geo Robson, World.Minds 2009.  
Sergei Lupashin, World.Minds 2008.

### **Major Ph.D. Awards**

Michael Muehlebach, Branco Weiss Fellow 2018.  
Michael Muehlebach, ETH Medal 2018.  
Mark Mueller, ETH Medal 2016.  
Mark Mueller, Georges Giralt Ph.D. Award 2016 .  
Markus Hehn, Jakob Ackeret Award 2014.  
Sebastian Trimpe, Klaus Tschira Award 2014.  
Angela Schoellig, ETH Medal 2012.  
Angela Schoellig, Dimitris N. Chorafas Foundation Award 2012.