

# ANIL UFUK BATMAZ

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[ResearchGate](#)

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## RECENT ACADEMIC POSITION

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**Post-Doctoral Fellow** (since 2018), with W. Stuerzlinger, Simon Fraser University, Vancouver

- Human-Computer Interaction, Virtual and Mixed Reality, 3D User Interfaces;
- Sports training and rehabilitation in Virtual Reality and Augmented Reality;
- COVID-19 data visualization & user experience analysis for mobile phones and Mixed Reality;
- Machine learning in Virtual Reality and Augmented Reality to improve user experience;
- Augmented Reality user interface design for technicians dealing with very large object inspection;
- Assistance with the supervision of graduate students.

## EDUCATION

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**PhD in Biomedical Engineering** (2015-2018), University of Strasbourg, Strasbourg (IDEX Project). Thesis: “Speed, precision and grip force analysis of human manual operations with and without direct visual input.”

- Human motor performance assessment in image-guided surgery;
- Virtual and Augmented Reality for surgical training systems;
- Learning and training with image-guided surgical systems.

Thesis data and code: <https://osf.io/avyk6>.

**Master of Science in Electrics and Electronics Engineering** (2011-2013), TOBB Economy and Technology University, Ankara (GPA 3.57/4). Thesis: “Design of Multi-Rotor Unmanned Aerial Vehicle and Optimization of Resource Allocation in Wireless Sensor Networks”

- Unmanned systems and control systems in robotics;
- Wireless communication;
- Computer vision.

**Bachelor of Science** (2007-2011) TOBB Economy and Technology University, Ankara

- Major in Electrics and Electronics Engineering (GPA 3.54/4);
- Minor in Computer Engineering (GPA 3.20/4).

## PUBLICATIONS

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### Journal Articles

- J1. Batmaz AU, Maiero J, Riecke B, Kruijff E, Carman N, Stuerzlinger W (2020) How Automatic Speed Control Based on Distance Affects User Behaviours in Telepresence Robot Navigation within Dense Conference-like Environments. *PLoS ONE*, vol. 15, no.11, pp 1-41.
- J2. Steed A, Ortega F, Williams A, Kruijff E, Stuerzlinger W, Batmaz AU, Won A, Rosenberg ES, Simeone A, Hayes A (2020) Evaluating Immersive Experiences During COVID-19 and Beyond. *ACM Interactions*, Vol: 27, no:4, pp. 62–67.
- J3. Batmaz AU, de Mathelin M, Dresch-Langley B (2018) Effects of 2D and 3D image views on hand movement trajectories in the surgeon's peri-personal space in a computer controlled simulator environment. *Cogent Medicine*, vol. 4, no.1, pp. 1-16.
- J4. Batmaz AU, de Mathelin M, Dresch-Langley B (2017) Seeing virtual while acting real: Visual display and strategy effects on the time and precision of eye-hand coordination. *PLoS ONE*, vol. 12, no.8, pp 1-18.
- J5. Batmaz AU, de Mathelin M, Dresch-Langley B (2016) Getting nowhere fast: trade-off between speed and precision in training to execute image-guided hand-tool movements. *BMC Psychology*, vol. 4, no. 1, pp. 1-19.

- J6. Batmaz AU, Yildiz HU, Tavli B (2014) Role of unidirectionality and reverse path length on wireless sensor network lifetime. *IEEE Sensors Journal*, vol. 14, no.11, pp. 3971-3982.
- J7. Batmaz AU, Elbir O, Kasnakoglu C (2013) Design of a quadrotor roll controller using system identification to improve empirical results. *IJMMM*, vol. 1, no.4, pp. 347-349.

### Conference Articles

- C1. Batmaz AU, Stuerzlinger W (2021, in press) The Effect of Pitch in Auditory Error Feedback for Fitts' Tasks in Virtual Reality Training Systems. In *Proceedings of IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Virtual event, 10 pages.
- C2. Batmaz AU, Sun X, Taskiran D, Stuerzlinger W (2020) Eye-Hand Coordination Training for Sports with Mid-air VR. In *Proceedings of ACM VRST 2020*, Virtual event, pp. 585-592.
- C3. Batmaz AU, Rajabi Seraji M, Kneifel J, Stuerzlinger W (2020) No Jitter Please: Effects of Rotational and Positional Jitter on 3D Mid-Air Interaction. In *Proceedings of Future Technologies Conference*, Springer Verlag, Virtual event, pp. 792-808.
- C4. Batmaz AU, Mutasim AK, Malekmakan M, Sadr E, Stuerzlinger W (2020) Touch the Wall: Comparison of Virtual and Augmented Reality with Conventional 2D Screen Eye-Hand Coordination Training Systems. In *Proceedings of IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Virtual event, 11 pages.
- C5. Batmaz AU, Sun X, Taskiran D, Stuerzlinger W (2019) Hitting the Wall: Mid-Air Interaction for Eye-Hand Coordination. In *Proceedings of ACM VRST*, Sydney, Australia, 5 pages.
- C6. Batmaz AU, Barrera Machuca MD, Pham DM, Stuerzlinger W (2019) Do Head-Mounted Display Stereo Deficiencies Affect 3D Pointing Tasks in AR and VR? In *Proceedings of IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Osaka, Japan, pp. 585-592.
- C7. Batmaz AU, de Mathelin M, Dresp-Langley B (2018) Effects of image size and structural complexity on time and precision of hand movements in head mounted virtual reality. In *Proceedings of IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Reutlingen, Germany, pp. 167-174.
- C8. Batmaz AU, Falek MA, Zorn L, Nageotte F, Zanne P, de Mathelin M, Dresp-Langley B (2017) Novice and expert haptic behaviours while using a robot controlled surgery system. In *13th IASTED International Conference on Biomedical Engineering (BioMed)*, Innsbruck, Austria, pp. 94-99.
- C9. Batmaz AU, Tavli B, Incebacak D, Bicakci K (2013) The impact of link unidirectionality and reverse path length on wireless sensor network lifetime. In *IEEE International Conference on Communications (ICC)*, Budapest, Hungary, pp. 1795-1799.
- C10. Batmaz AU, Elbir O, Kasnakoglu C (2013) Quadrotor roll and pitch stabilization using system identification based redesign of empirical controller. In *Proceedings of the 36th IASTED International Conference on, Modelling, Identification and Control (MIC)*, Innsbruck, Austria, pp. 1-5.
- C11. Elbir O, Batmaz AU, Kasnakoglu C (2013) Improving quadrotor 3-axes stabilization results using empirical results and system identification. In *Proceedings of 9th Asian Control Conference (ASCC)*, Istanbul, Turkey, pp. 1-5.
- C12. Batmaz AU, Tavli B, Incebacak D, Bicakci K (2013) Effects of handshake of length of unidirectional links on the lifetime of wireless sensor networks. In *Proceedings of 21st Signal Processing and Communications Applications Conference (SIU)*, Kyrenia, Cyprus, pp. 1-4.
- C13. Batmaz AU, Ertin O, Elbir O (2013). Preliminary design of remote mine sweeping and identification systems. In *Proceedings of the Mechatronics Engineering Student Congress Conference*, Ankara, Turkey, pp. 9-16.

### Workshop Papers

- W1. Batmaz AU, Stuerzlinger W (2021, to appear) Effects of Different Auditory Feedback Frequencies in Virtual Reality 3D Pointing Tasks. *Workshop on Novel Input Devices and Interaction Techniques (NIDIT) 2021, part of IEEE VR 2021*, Virtual event, 6 pages.

- W2. Batmaz AU, Mutasim AK, Stuerzlinger W (2020). Precision vs. Power Grip: A Comparison of Pen Grip Styles for Selection in Virtual Reality. *Workshop on Novel Input Devices and Interaction Techniques (NIDIT) 2020, part of IEEE VR 2020*, Virtual event, 6 pages.
- W3. Batmaz AU, Stuerzlinger W (2019) Effects of 3D Rotational Jitter and Selection Methods on 3D Pointing Tasks. *Workshop on Novel Input Devices and Interaction Techniques (NIDIT) 2019, part of IEEE VR 2019*, Osaka, Japan, pp. 1687-1692.

## Posters

- P1. Batmaz AU, Stuerzlinger W (2020) Effect of Fixed and Infinite Ray Length on Distal 3D Pointing in Virtual Reality. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '20 Extended Abstracts)*, April 25-30, 2019, Honolulu, Hawaii USA. ACM, New York, NY, USA, 6 pages.
- P2. Mutasim AK, Batmaz AU, Stuerzlinger W (2020) Gaze Tracking for Eye-Hand Coordination Training Systems in Virtual Reality. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '20 Extended Abstracts)*, April 25-30, 2019, Honolulu, Hawaii USA. ACM, New York, NY, USA, 6 pages.
- P3. Batmaz AU, Stuerzlinger W (2019) The Effect of Rotational Jitter on 3D Pointing Tasks. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '19 Extended Abstracts)*, May 4–9, 2019, Glasgow, Scotland UK. ACM, New York, NY, USA, 6 pages.
- P4. Batmaz AU, de Mathelin M, Dresch-Langley B (2019). Different sound pitch effects on motor performance of individuals in head-mounted virtual reality. *Perception Vol:48 European Conference on Visual Perception (ECVP) Supplement*, Trieste, Italy, pp. 21.
- P5. Batmaz AU, de Mathelin M, Dresch-Langley B (2017) Effects of relative target position on ipsilateral and contralateral manual operations in head-mounted virtual reality. *Perception Vol:47 European Conference on Visual Perception (ECVP) Supplement*, Berlin, Germany, pp. 83.
- P6. Batmaz AU, de Mathelin M, Dresch-Langley B (2016) Effects of indirect screen vision and tool-use on the time and precision of object positioning on real-world targets. *Perception Vol:45 European Conference on Visual Perception (ECVP) Supplement*, Barcelona, Spain, pp. 196.

## Talks

- T1. Virtual Reality challenged by the image guided surgery (Invited) (2017) *Réalité Virtuelle Et Réalité Augmentée Au Service De L'ingénieur De Demain*, Paris France.
- T2. Inside the virtual brain: using OCULUS DK2 for surgical planning (May 2017) *The Annual World Congress of Neurotalk*, Barcelona, Spain.

## Papers under Review or in Preparation (information partially redacted)

- S1. Batmaz AU, et al. (2021) Gaze Tracking for Small Targets, ACM ETRA 2021.
- S2. Batmaz AU, et al. (2021) Comparison of Pointing Performance in a Single and Multi-Focal Stereo Display, Science 2021.
- S3. Batmaz AU, et al. (2021) Shannon Capacity Formula for Steering Law, ACM UIST 2021.
- S4. Batmaz AU, et al. (2021) Effective Throughput Analysis for Task Execution Strategies, IEEE ISMAR 2021.
- S5. Batmaz AU, et al. (2021) 3D Covid-19 Visualization, IEEE VIS 2021.
- S6. Batmaz AU, et al. (2022) Rotational and Positional Jitter in Virtual Reality Interaction, Springer Book on Everyday Virtual and Augmented Reality

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## ACADEMIC LEADERSHIP

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### Chair

- ACM Virtual Reality Software and Technology (VRST) 2020

### Organizer

- Novel Input Devices and Interaction Techniques (NIDIT) Workshop 2021

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## Editorial

- Special edition of Frontiers journal for multimodal interaction (Co-guest editor)

## International Committee Member (IAC)

- International Conference on Computer Animation and Social Agents (CASA) 2021
- ACM Conference on Human Factors in Computing Systems (CHI) 2021 Late Breaking Work
- IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2021
- ACM Virtual Reality Software and Technology (VRST) 2020
- International Symposium on Visual Computing (ISVC) 2020
- IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2020
- IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2019

## Public Scientific Presentations & Organizational Contributions

- “Virtual Reality in Surgery”, invited speaker at Pint of Science, Strasbourg/France, 2017.
- “A peek into the Council of Europe”, conference organization at University of Strasbourg/France, 2016.

## TEACHING

### Instructor

- Computerized Controlling with MATLAB, 2012 (2 x one semester)  
Designed the course, all teaching materials, and assignments, and lectured undergraduate/graduate students weekly.

### Teaching Assistantships

- Signal Processing, 2012 (one semester)  
Homework assignment creation and assessment, tutorials, grading.
- Telecommunications Network Optimization, 2012 (one semester)  
Assignments creation and assessment, project creation and evaluation, tutorials, grading.

### Laboratory Assistant

- Control Systems Laboratory, 2011 (one semester)  
Assignments creation and assessment, project creation and evaluation, tutorials, grading.

I have done presentations and stood in for lectures on 3D user interaction at Simon Fraser University.

## AWARDS AND CERTIFICATES

- IDEX Laureate grant for PhD position, 2015-2018, University of Strasbourg Strasbourg/France.
- Full scholarship for Master’s degree, 2011-2013, TOBB ETU Ankara/Turkey.
- Distinction certificate, 2008, TOBB ETU Ankara/Turkey.

## PROFESSIONAL EXPERIENCE

### Software Team leader at GFDS Inc. <http://www.gfds-inc.com> (2013-2015)

- Collaborated with industry partners to design platform and software specifications to meet their needs and constraints for simulator and training systems in various industries including car battery manufacturer, education and vehicle construction manufacturer.
- Lead a team of six developers to create VR-based multi-user distributed Boeing simulator for cooperative pilot education and training.
- Created digital twins of the patients for a zSpace medical training and diagnosis application based on Python, VTK and OpenGL.

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- Developed the software and hardware of a glove to interact with objects in VR, used in a variety of commercial applications.

## Co-op/Internships

- Electrical System Modelling with MATLAB for Hürkuş Aircraft Project at Turkish Aerospace Industries, 2011.
- Communication Test Software with Python for ANKA Aircraft (Advanced Medium Altitude Long Endurance-class Unmanned Aerial System) at Turkish Aerospace Industries, 2011.
- Electrical Wiring of the Hürkuş Aircraft Project at Turkish Aerospace Industries, 2009.
- Analogue servo-motor driver and controller development at Herkül Project at the R&D Department of ASELSAN (Military Electronic Industries), 2008.

## RELEVANT SKILLS

### Software

Python, C#, MATLAB, Simulink, Visual Basic, GAMS, JavaScript, Arduino and Ardupilot, C, C++, HTML, Java, OpenGL, VTK.

### Applications

Unity 3D, LaTeX, Unreal Engine, SPSS, GraphPad, SigmaPlot, JMP.

### Languages

- English – Advanced: Good oral, written and communication skills.
- French – Intermediate (B2 level): Courses at University of Strasbourg and Université Populaire Européene.
- Turkish – Native.

## ACADEMIC REFERENCES

### Wolfgang Stuerzlinger

Full professor at School of Interactive Arts & Technology, Simon Fraser University, Vancouver/Canada

Post-doctoral supervisor

[w.s@sfu.ca](mailto:w.s@sfu.ca)

### Michel de Mathelin

Vice chairperson of the university, University of Strasbourg, Strasbourg/France

Thesis co-supervisor

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### Jean-Christophe Cassel

Head of the LNCA lab, University of Strasbourg/France

PhD thesis jury member

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### Carman Neustaedter

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