Necati Cihan Camgöz, PhD

CONTACT
INFORMATION

Meta Reality Labs
Zurich, Switzerland

Web: www.cihancamgoz.com
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FIELDS OF
INTERESTS

Computer Vision, Deep Learning, Human-Computer Interaction
AR/VR, Mixed Reality, Sign Language Recognition and Translation

RESEARCH
EXPERIENCE

Meta, Zurich, Switzerland — **July 2022 – Present**
Meta Reality Labs, Research Scientist - Input and Action Recognition

University of Surrey, Guildford, UK — **July 2016 – July 2023**
Centre for Vision Speech and Signal Processing, Visiting Research Fellow — *July 2022 – July 2023*
Centre for Vision Speech and Signal Processing, Senior Research Fellow (RA-II) — *Oct. 2021 – June 2022*
Centre for Vision Speech and Signal Processing, Research Fellow (RA-I) — *Aug. 2020 – Oct. 2021*
Centre for Vision Speech and Signal Processing, Postgraduate Research Student — *July 2016 – July 2020*

Facebook, London, UK — **Nov 2018 – July 2019**
Facebook Reality Labs, Research Scientist (Contingent Worker)

Facebook Reality Labs, Redmond, WA, USA — **May 2018 – Sept. 2018**
Oculus Research, Research Intern

Boğaziçi University, İstanbul, Turkey — **Dec. 2013 – June 2016**
Perceptual Intelligence Laboratory (PILAB), Research Assistant

Lodz Technical University - Politechnika, Lodz, Poland — **July 2012 – Aug. 2012**
Department of Applied Sciences, IAESTE Summer Intern

Yıldız Technical University, İstanbul, Turkey — **June 2011 – Sept. 2013**
Intelligent System Laboratories (ISL), Undergraduate Research Student

EDUCATION

University of Surrey, PhD in Computer Vision and Machine Learning, Guildford, UK — **2016 – 2020**
Thesis: Neural Sign Language Recognition and Translation
Advisors: Prof. Dr. Richard Bowden and Dr. Simon Hadfield

Boğaziçi University, MSc in Computer Engineering, İstanbul, Turkey — **2013 – 2016**
GPA: 3.94 / 4.00
Thesis: Human Computer Interaction Platform for the Hearing Impaired
Advisor: Prof. Dr. Lale Akarun

Yıldız Technical University, BSc in Computer Engineering, İstanbul, Turkey — **2008 – 2013**
GPA: 3.79 / 4.00
Junior Project: Developing an Image Processing Library for ARM Cored Microprocessors
Senior Project: An Intelligent Indoor Video Surveillance System: Gözüm Üstünde
Advisor: Assoc. Prof. Dr. Ali Gökhan Yavuz

TEACHING
EXPERIENCE

University of Surrey, Guildford, UK
- EEE3013 – Object-Oriented Design and C++, Autumn 2016, Teaching Assistant

Boğaziçi University, İstanbul, Turkey
- CmpE58Z – Introduction to Biometrics (Graduate Course), Spring 2016, Teaching Assistant
- CmpE537 – Computer Vision (Graduate Course), Autumn 2015, Teaching Assistant
- CmpE58Z – Introduction to Biometrics (Graduate Course), Spring 2015, Teaching Assistant

PROFESSIONAL
SERVICES

Organizer
- Sign Language Recognition, Translation and Production Workshop, ECCV 2020.
- Sign Language Recognition, Translation and Production Workshop v2, ECCV 2022.
- First WMT shared task on Sign Language Translation (WMT-SLT), 2022.
- Second WMT shared task on Sign Language Translation (WMT-SLT), 2023.

Reviewer
- IEEE Pattern Analysis and Machine Intelligence (PAMI), 2017 – Present.
- IEEE Signal Processing Letters (SPL), 2017 – Present
- Image and Vision Computing (IMAVIS), 2017 – Present
- International Journal of Computer Vision (IJCV), 2019 – Present
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2022 – Present
- IEEE International Conf. on Computer Vision and Pattern Recognition (CVPR), 2018, 2020, 2021, 2022.
- IEEE International Conf. on Computer Vision (ICCV), 2019, 2023.
- European Conf. on Computer Vision (ECCV), 2020, 2022.
- IEEE International Conf. on Automatic Face and Gesture Recognition (FG), 2017 – 2021.
- IEEE Winter Conf. on Applications of Computer Vision (WACV), 2019 – 2024.
- Asian Conference on Computer Vision (ACCV), 2019, 2020.
- British Machine Vision Conference (BMVC), 2020, 2021.
- IEEE International Conf. on Robotics and Automation (ICRA), 2017, 2018, 2020.
- 12th International Conference on Language Resources and Evaluation (LREC), 2020

Local Committee and Volunteering
- IEEE International Conf. on Computer Vision (ICCV), 2017, Student Volunteer.
- IEEE International Conf. on Automatic Face and Gesture Recognition (FG), 2015, Student Volunteer.
- ACM International Conf. on Multimodal Interaction (ICMI), 2014, Local Committee.

INVITED TALKS
- "Neural Sign Language Recognition and Translation", Bogazici University, Turkey, January 2022.
- "Sign Language Recognition, Translation and Production using Deep Learning", University of Zurich, Switzerland, October 2018.

AWARDS
- 1st place – ECCV 2022, ChaLearn Workshop, Sign Spotting Challenge, MSSL track, July 2022.
- 3rd place – ECCV 2022, ChaLearn Workshop, Sign Spotting Challenge, OSLWL track, July 2022.
- Postgraduate Research Student of the Year, Vice Chancellor Awards, University of Surrey, October 2018.
- Postgraduate Research Student of the Year in Faculty of Engineering and Physical Sciences, University of Surrey, July 2018.
- 3rd Place – Continuous Gesture Recognition Challenge, 2nd Round in IEEE International Conference of Computer Vision (ICCV), ChaLearn Looking at People Workshop, October 2017.
- 2nd Place – Continuous Gesture Recognition Challenge in IEEE 23rd International Conference of Pattern Recognition (ICPR), ChaLearn Looking at People Workshop, December 2016.
- 7th Place among 17 Participants – Gesture Recognition Challenge in European Conference on Computer Vision (ECCV), ChaLearn Looking at People Workshop, June 2014.
- 1st Prize – The Scientific and Technological Research Council of Turkey (TUBITAK), Undergraduate Students Software Projects Competition (Program #2242), Embedded Systems Category, with the Project: Gözüm Üstünde, June 2013.
- 1st Prize – Indra's Future Minds Competition, 3rd Edition, Brazil, April 2013.

SCHOLARSHIPS
- Overseas Research Scholarship – University of Surrey, July 2016 – July 2019.
- PhD Scholarship – Swiss National Science Foundation (SNSF), July 2016 – July 2019.
- Thesis Student Scholarship – Republic of Turkey, Ministry of Science, Industry and Technology, Industrial Thesis Program (SANTEZ), Mar. 2014 – Feb. 2016.
- Masters Scholarship – Technological Research Council of Turkey (TUBITAK), Graduate Scholarship Program (Program #2210) (Discontinued after receiving Industrial Thesis Program Scholarship), Oct. 2013 – Oct. 2015.
- Open Business Software Solutions (OBSS), Senior Undergraduate Student Merit Scholarship, Sept. 2011 – Sept. 2012.

HONORS
- Awarded with the Fulbright Ph.D. Scholarship, but not used. July 2014.
- Graduated with High Honors (Highest GPA among the Computer Engineering Graduates) - Yıldız Technical University, Computer Engineering Department. June 2013.

LANGUAGES
- Turkish – Native language.
- English – Speak fluently, read and write with high proficiency.
- British Sign Language (BSL) – Stage 2.
- Beginner: German, Turkish Sign Language (TİD).

STUDENTS

GRADUATED:
- Harry Walsh (Undergrad Thesis, 2020 - 2021, Co-supervised with R. Bowden)
- Mathew Vowels (MSc, 2018 - 2019, Co-supervised with R. Bowden)
- Mathew Vowels (PhD, 2019 - 2022, Co-supervised with R. Bowden)

ONGOING:
- Ryan Wong (PhD, 2021 - , Co-supervised with R. Bowden)
- Benjamin Saunders (PhD, 2019 - , Co-supervised with R. Bowden)

PUBLICATIONS

THESIS

PhD. **Necati Cihan Camgöz**, *Neural Sign Language Recognition and Translation*, PhD Thesis, University of Surrey, 2020.

MSc. **Necati Cihan Camgöz**, *Human-Computer Interaction Platform for the Hearing Impaired in Healthcare and Finance Applications*, MSc Thesis, Boğaziçi University, 2016.

JOURNAL PAPERS

J7. Matthew Vowels, Sina Akbari, **Necati Cihan Camgöz**, Richard Bowden, *A Free Lunch with Influence Functions? An Empirical Evaluation of Influence Functions for Average Treatment Effect Estimation*, Transactions on Machine Learning Research, 2023.

J6. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *D'ya like DAGs? A Survey on Structure Learning and Causal Discovery*, ACM Computing Surveys, 2022.

J5. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Continuous 3D Multi-Channel Sign Language Production via Progressive Transformers and Mixture Density Networks*, International Journal of Computer Vision (IJCV), 2021.

J4. Stephanie Stoll, **Necati Cihan Camgöz**, Simon Hadfield, Richard Bowden, *Text2Sign: Towards Sign Language Production using Neural Machine Translation and Generative Adversarial Networks*, International Journal of Computer Vision (IJCV), 2020.

J3. Oscar Koller, **Necati Cihan Camgöz**, Hermann Ney, Richard Bowden, *Weakly Supervised Learning with Multi-Stream CNN-LSTM-HMMs to Discover Sequential Parallelism in Sign Language Videos*, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2019.

J2. Terry Windeatt, Cemre Zor, **Necati Cihan Camgöz**, *Approximation of Ensemble Boundary using Spectral Coefficients*, IEEE Transactions on Neural Networks and Learning Systems (TNNLS), Volume 30, Number 4, 2019.

J1. M. Amaç Güvensan, A. Oğuz Kansız, **Necati Cihan Camgöz**, H. İrem Türkmen, A. Gökhan Yavuz, M. Elif Karsıgil, *An Energy-Efficient Multi-Tier Architecture for Fall Detection on Smartphones*, Sensors, Volume 17, Issue 7, 1487, 2017.

TECHNICAL REPORTS

T1. Samuel Albanie, Gül Varol, Liliane Momeni, Triantafyllos Afouras, Andrew Brown, Chuhan Zhang, Ernesto Coto, **Necati Cihan Camgöz**, Ben Saunders, Abhishek Dutta, Neil Fox, Richard Bowden, Bencie Woll, Andrew Zisserman, *Signer Diarisation in the Wild*, Technical Report, 2021.

BOOK CHAPTERS

B2. Sarah Ebling, **Necati Cihan Camgöz**, Richard Bowden, *Use of New Technologies in L2 Signed Language Assessment*, The Handbook of Language Assessment Across Modalities, Oxford University Press, 2021.

B1. Sarah Ebling, Phuong Nguyen, Volker Hegelheimer, **Necati Cihan Camgöz**, Richard Bowden, *Discussion on New Technologies in Spoken and Signed Language Testing*, The Handbook of Language Assessment Across Modalities, Oxford University Press, 2021.

PREPRINTS

P2. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Skeletal Graph Self-Attention: Embedding a Skeleton Inductive Bias into Sign Language Production*, arXiv preprint arXiv:2112.05277, 2021.

P1. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Everybody Sign Now: Translating Spoken Language to Photo Realistic Sign Language Video*, arXiv preprint arXiv:2011.09846, 2020.

CONFERENCE PROCEEDINGS

C28. Mathias Müller, Sarah Ebling, Eleftherios Avramidis, Alessia Battisti, Michele Berger, Richard Bowden, Annelies Braffort, **Necati Cihan Camgöz**, Cristina Espana-Bonet, Roman Grundkiewicz, Zifan Jiang, Oscar Koller, Amit Moryossef, Regula Perrollaz, Sabine Reinhard, Annette Rios, Dimitar Shterionov, Sandra Sidler-Miserez, Katja Tissi, Davy Van Landuyt, *First WMT Shared Task on Sign Language Translation (WMT-SLT22)*, 24th Annual Conference of the European Association for Machine Translation (EAMT), 2023.

C27. Mathias Müller, Sarah Ebling, Eleftherios Avramidis, Alessia Battisti, Michele Berger, Richard Bowden, Annelies Braffort, **Necati Cihan Camgöz**, Cristina Espana-Bonet, Roman Grundkiewicz, Zifan Jiang, Oscar Koller, Amit Moryossef, Regula Perrollaz, Sabine Reinhard, Annette Rios Gonzales, Dimitar Shterionov, Sandra Sidler-Miserez, Katja Tissi, *Findings of the First WMT Shared Task on Sign Language Translation (WMT-SLT22)*, Proceedings of the Seventh Conference on Machine Translation (WMT), 2022.

C26. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Signing at Scale: Learning to Co-Articulate Signs for Large-Scale Photo-Realistic Sign Language Production*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

C25. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Mixed SIGNals: Sign Language Production via a Mixture of Motion Primitives*, IEEE 20th International Conference on Computer Vision (ICCV), 2021.

C24. **Necati Cihan Camgöz**, Benjamin Saunders, Guillaume Rochette, Marco Giovanelli, Giacomo Inches, Robin Nachtrab-Ribback, Richard Bowden, *Content4All Open Research Sign Language Translation Datasets*, IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021.

C23. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *AnonySign: Novel Human Appearance Synthesis for Sign Language Video Anonymisation*, IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021.

C22. Tao Jiang, **Necati Cihan Camgöz**, Richard Bowden, *Looking for the Signs: Identifying Isolated Sign Instances in Continuous Video Footage*, IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021.

C21. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *Targeted VAE: Structured Inference and Targeted Learning for Causal Parameter Estimation*, IEEE International Conference on Smart Data Services (SMDS), 2021.

C20. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *VDSM: Unsupervised Video Disentanglement with State-Space Modeling and Deep Mixtures of Experts*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.

C19. Samuel Albanie, Gül Varol, Liliane Momeni, Triantafyllos Afouras, Andrew Brown, Chuhan Zhang, Ernesto Coto, **Necati Cihan Camgöz**, Ben Saunders, Abhishek Dutta, Neil Fox, Richard Bowden, Bencie Woll, Andrew Zisserman, *SeeHear: Signer Diarisation and a New Dataset*, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2021.

C18. Sandrine Tornay, **Necati Cihan Camgöz**, Richard Bowden, Mathew Magimai-Doss, *A Phonology-based Approach for Isolated Sign Production Assessment in Sign Language*, 22nd ACM International Conference on Multimodal Interaction (ICMI), Late-Breaking Results, 2020.

C17. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Adversarial Training for Multi-Channel Sign Language Production*, British Machine Vision Conference (BMVC), 2020.

C16. Benjamin Saunders, **Necati Cihan Camgöz**, Richard Bowden, *Progressive Transformers for End-to-End Sign Language Production*, 16th European Conference on Computer Vision (ECCV), 2020.

C15. **Necati Cihan Camgöz**, Oscar Koller, Simon Hadfield, Richard Bowden, *Sign Language Transformers: Joint End-to-end Sign Language Recognition and Translation*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), *Oral*, (16-20 June 2020).

C14. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *NestedVAE: Isolating Common Factors via Weak Supervision*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), (16-20 June 2020).

C13. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *Gated Variational AutoEncoders: Incorporating Weak Supervision to Encourage Disentanglement*, IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2020.

C12. Sandrine Tornay, Marzieh Razavi, **Necati Cihan Camgöz**, Richard Bowden, Mathew Magimai-Doss, *HMM-based Approaches to Model Multichannel Information in Sign Language Inspired from Articulatory Features-based Speech Processing*, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), *Oral*, (12–17 May 2019).

C11. Stephanie Stoll, **Necati Cihan Camgöz**, Simon Hadfield, Richard Bowden, *Sign Language Production using Neural Machine Translation and Generative Adversarial Networks*, British Machine Vision Conference (BMVC), *Oral*, (3–6 September 2018).

C10. **Necati Cihan Camgöz**, Simon Hadfield, Oscar Koller, Hermann Ney, Richard Bowden, *Neural Sign Language Translation*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), (18–22 June 2018).

C9. Sarah Ebling, **Necati Cihan Camgöz**, Penny Boyes Braem, Katja Tissi, Sandra Sidler-Miserez, Stephanie Stoll, Simon Hadfield, Tobias Haug, Richard Bowden, Sandrine Tornay, Marzieh Razavi, Mathew Magimai-Doss, *SMILE Swiss German Sign Language Dataset*, 11th Edition of the Language Resources and Evaluation Conference (LREC), (7–12 May 2018).

C8. **Necati Cihan Camgöz**, Simon Hadfield, Oscar Koller, Richard Bowden, *SubUNets: End-to-end Hand Shape and Continuous Sign Language Recognition*, IEEE 16th International Conference on Computer Vision (ICCV), *Oral: Spotlight*, (22-29 October 2017).

C7. **Necati Cihan Camgöz**, Ahmet Alp Kındıroğlu, Serpil Karabüklü, Meltem Kelepir, A. Sumru Özsoy, Lale Akarun, *BosphorusSign: A Turkish Sign Language Recognition Corpus in Health and Finance Domains*, 10th Edition of the Language Resources and Evaluation Conference (LREC), (23–28 May 2016).

C6. Oğulcan Özdemir, **Necati Cihan Camgöz**, Lale Akarun, *Isolated Sign Language Recognition using Improved Dense Trajectories*, IEEE 24th Signal Processing and Communications Applications Conference (SIU), (16–19 May 2016). [In Turkish]

C5. Muhammed Miraç Süzgün, Hilal Özdemir, **Necati Cihan Camgöz**, Ahmet Alp Kındıroğlu, Doğaç Başaran, Cengiz Togay, Lale Akarun, *HospiSign: An Interactive Sign Language Platform for Hearing Impaired*, International Conference on Computer Graphics, Animation and Gaming Technologies (Eurasia Graphics), (19–20 November 2015).

C4. **Necati Cihan Camgöz**, Berk Gökberk, Lale Akarun, *Facial Landmark Localization in Depth Images using Supervised Descent Method*, IEEE 23rd Signal Processing and Communications Applications Conference (SIU), (16–19 May 2015). [In Turkish]

C3. **Necati Cihan Camgöz**, Ahmet Alp Kındıroğlu, Lale Akarun, Oya Aran, *Domain Adaptation for Gesture Recognition Using Hidden Markov Models*, IEEE 22nd Signal Processing and Communications Applications Conference (SIU), (22–25 April 2014). [In Turkish]

C2. **Necati Cihan Camgöz**, Cihan Tayşi, Amaç Güvensan, Elif Karsıgil, Gökhan Yavuz, *A Fast and Accurate Motion Detection Algorithm for Embedded Systems*, IEEE 21st Signal Processing and Communications Applications Conference (SIU), (24–26 April 2013). [In Turkish]

C1. **Necati Cihan Camgöz**, Recep Öztürk, Cihan Tayşi, Amaç Güvensan, Gökhan Yavuz, *Image Processing Capabilities of New Generation ARM Cores for WMSNs*, IEEE 20th Signal Processing and Communications Applications Conference (SIU), (18–20 April 2012). [In Turkish]

WORKSHOP PROCEEDINGS

W13. Ryan Wong, **Necati Cihan Camgöz**, Richard Bowden, *Hierarchical I3D for Sign Spotting* , 17th European Conference on Computer Vision Workshops (ECCVW), 2022.

W12. Tao Jiang, **Necati Cihan Camgöz**, Richard Bowden, *Skeletor: Skeletal Transformers for Robust Body-Pose Estimation*, IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2021.

W11. Amit Moryossef, Ioannis Tsochantaridis, Joe Dinn, **Necati Cihan Camgöz**, Richard Bowden, Tao Jiang, Annette Rios, Mathias Müller, Sarah Ebling, *Evaluating the Immediate Applicability of Pose Estimation for Sign Language Recognition*, IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2021.

W10. Matthew Vowels, **Necati Cihan Camgöz**, Richard Bowden, *Shadow-Mapping for Unsupervised Neural Causal Discovery*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.

W9. **Necati Cihan Camgöz**, Gül Varol, Samuel Albanie, Neil Fox, Richard Bowden, Andrew Zisserman, Kearsy Cormier, *SLRTP 2020: The Sign Language Recognition, Translation & Production Workshop*, 16th European Conference on Computer Vision Workshops (ECCVW), 2020.

W8. **Necati Cihan Camgöz**, Oscar Koller, Simon Hadfield, Richard Bowden, *Multi-channel Transformers for Multi-articulatory Sign Language Translation*, 16th European Conference on Computer Vision Workshops (ECCVW), 2020.

W7. Oğulcan Özdemir, Ahmet Alp Kındıroğlu, **Necati Cihan Camgöz**, Lale Akarun, *BosphorusSign22k Sign Language Recognition Dataset*, 9th Workshop on the Representation and Processing of Sign Languages, 2020.

W6. Kearsy Cormier, Neil Fox, Bencie Woll, Andrew Zisserman, **Necati Cihan Camgöz**, Richard Bowden, *ExTOL: Automatic recognition of British Sign Language using the BSL Corpus*, International Workshops and Symposia on Sign Language Translation and Avatar Technology (SLTAT), (29 September 2019).

W5. **Necati Cihan Camgöz**, Simon Hadfield, Richard Bowden, *Particle Filter based Probabilistic Forced Alignment for Continuous Gesture Recognition*, IEEE 16th International Conference on Computer Vision Workshops (ICCVW), (29 October 2017).

W4. **Necati Cihan Camgöz**, Simon Hadfield, Oscar Koller, Richard Bowden, *Using Convolutional 3D Neural Networks for User-Independent Continuous Gesture Recognition*, IEEE 23rd International Conference of Pattern Recognition Workshops (ICPRW), (4 December 2016).

W3. **Necati Cihan Camgöz**, Ahmet Alp Kındıroğlu, Lale Akarun, *Sign Language Recognition for Assisting the Deaf in Hospitals*, 7th International Workshop on Human Behavior Understanding (HBU), (16 October 2016).

W2. **Necati Cihan Camgöz**, Vitomir Štruc, Berk Gökberk, Lale Akarun, Ahmet Alp Kındıroğlu, *Facial Landmark Localization in Depth Images using Supervised Ridge Descent*, IEEE 15th International Conference on Computer Vision Workshops (ICCVW), (12 December 2015).

W1. **Necati Cihan Camgöz**, Ahmet Alp Kındıroğlu, Lale Akarun, *Gesture Recognition using Template Based Random Forest Classifiers*, 13th European Conference on Computer Vision Workshops (ECCVW), (6–7 September 2014).