D9.5 WORKSHOP AND TRAINING FOR EXPERTS IN UNDER–RESOURCED LANGUAGES – SESSION 2

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Abstract	This report describes the EASIER Autumn School, a workshop held on 25–26 September 2023 in Hamburg. Titled “Sign language data meets data science – data science meets sign linguistics”, the workshop had the goal of generating expertise for under-resourced sign languages (SLs) to extend the scope of EASIER to more European SLs. The idea was to not only support people who already work with SLs and train them in technological approaches, but also to train people from data science, language technologies, etc. in the handling of SLs. Two parallel tracks introduced both groups to relevant topics of the other area, followed by a joint track addressing language technologies of the EASIER pipeline and ethical considerations.

Keywords	training, under-resourced sign languages, language technology, sign language linguistics

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Nature of the deliverable	**DEC**	
Dissemination Level		
PU	Public, fully open, e. g., web	✓
CL	Classified, information as referred to in Commission Decision 2001/844/EC	
CO	Confidential to EASIER project and Commission Services	

R: Document, report (excluding the periodic and final reports)

DEM: Demonstrator, pilot, prototype, plan designs

* DEC: Websites, patents filing, press & media actions, videos, etc.

OTHER: Software, technical diagram, etc

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EXECUTIVE SUMMARY

We report on the EASIER Autumn School, a workshop held on 25–26 September 2023 in Hamburg. The autumn school with the title “Sign language data meets data science – data science meets sign linguistics” had the goal of generating expertise for under-resourced sign languages (SLs) to extend the scope of EASIER to more European SLs. The idea was to not only support people who already work with SLs and train them in technological approaches, but also to train people who already work within data science, language technologies, etc. in the handling of SLs. To this end, on day one two parallel tracks targeted at either of the two groups, introducing them to relevant topics from the other domain. This was followed by an interactive session, the hands-on fair, during which participants were given the opportunity to present their own work in the form of 17 posters and/or demonstrations. On the second day, new language technologies used in the EASIER pipeline as well as ethical considerations were addressed in a single general track. In total 15 courses were offered.

61 people from 17 different countries took part in the Autumn School. Seven researchers received travel funds by EASIER to be able to attend the workshop. Increasing the scope of the developed technology was fostered with the comprehensive syllabus and plenty of time for the participants to exchange. As a result, several new collaborations have been emerging between participants and EASIER. With the EASIER Autumn School Homepage we additionally created a resource with valuable training material for researchers.

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ABBREVIATIONS

IDGS	Institute of German Sign Language and Communication of the Deaf
IS	International Sign
NLP	Natural Language Processing
SL	sign language

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1 INTRODUCTION

In September 2023 the EASIER project organised an Autumn School in cooperation with the DGS-Korpus at the Institute of German Sign Language and Communication of the Deaf (IDGS) in Hamburg. The Autumn School, titled “Sign language data meets data science – data science meets sign linguistics”, had the goal of generating expertise for under-resourced sign languages (SLs) to extend the scope of EASIER to more European SLs. The idea was to not only support people who already work with SLs and train them in technological approaches, but also to train people who already work within data science, language technologies, etc. in the handling of SLs. To this end, day one consisted of two parallel tracks targeted at either of the two groups, introducing them to relevant topics from the other domain. On the second day a single general track addressed new language technology used in the EASIER pipeline as well as ethical considerations. In 15 presentations, knowledge about language technology, SL linguistics and SL data collection practices was presented. The presentations were held in International Sign (IS) or English.

On the afternoon of day one participants also had the possibility to present their own work and resources in the realm of a hands-on fair. 17 posters were presented showing work on lexical databases, avatar animations, writing systems and more.

Four interpreters for IS and English accompanied the workshop. 61 people from 17 countries were present.

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2 BACKGROUND

One of EASIER's goals is to increase the reach of the technologies developed by the project. Following an investigation of the current availability of datasets for various SLs (Kopf et al., 2021; Kopf et al., 2022), the project aims at offering training for regions for whose languages are particularly under-resourced, even compared to other sign languages, preventing their inclusion in efforts to create Natural Language Processing (NLP) technologies for SLs. The creation of the workshop described in this report builds on prior work within EASIER on facilitating the spread of SL technology (see Morgan et al., 2022). A first workshop on the topic of neologisms in SL translation was held in February 2023 in Athens (Morgan and Crasborn, 2023).[1]

The field of SL technology is growing, involving contributors from different disciplines. As Börstell (2023), De Meulder (2021) and Hill (2020) emphasize, not all the work done within the field is targeted towards the needs of the deaf community or involves deaf experts in its development. To improve this situation and spread awareness of these issues one of the goals of the EASIER Autumn School was to bring together experts from two fields central to the creation of SL technologies: data science and SL linguistics.

[1] https://www.project-easier.eu/news/2023/03/01/the-sign-neologisms-workshop/

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3 WORKSHOP

The workshop lasted one and a half days and contained 15 lectures, six of them targeting SL linguists, five of them targeting data scientists, and four dedicated to both target groups together (see Section 3.1 for a detailed description of the presentations). The workshop program was as follows:

Table 3.1: *Workshop schedule*

Monday, 25.09.2023		
Time	**Track A**	**Track B**
09:00 – 9:30	Registration	
09:30 – 10:15	101: Data science for sign language linguists (Thomas Hanke)	101: Sign linguistics for data scientists (Annika Herrmann)
10:15 – 11:00	First things first: Things you have to think about when collecting sign language data (Johanna Mesch)	
11:00 – 11:30	Coffee break	
11:30 – 12:15	Transcription: Improving the quality of annotation by using a lexical database (Kearsy Cormier)	Sequential and simultaneous: sign language morphology (Cornelia Loos)
12:15 – 13:00	Making your dictionary useful beyond looking up signs and making it fit for automatic processing (Sarah Ebling)	From signing space to strings on paper: writing down sign languages phonetically (Maria Kopf)
13:00 – 13:45	Lunch break	
13:45 – 14:30	Future technology I: Using the power of wordnet for dictionary work (Sam Bigeard)	Getting started with sign language data: Where do I find sign language data and how do I treat it – handling glosses, overfitting, and NLP tools (Thomas Hanke)
14:30 – 15:15	Future technology II: Make your data searchable with keywords, HamNoSys and the Super Spotter (Reiner Konrad and Maren Brumm)	Do you like it? Gathering Feedback in an accessible way (Davy Van Landuyt)
15:15 – 15:45	Coffee break	
15:45 – 18:00	Hands-on Fair (everyone)	
Tuesday, 26.09.2023		
09:00 – 09:45	No MoCap, no problem – MediaPipe and OpenPose (Amit Moryossef)	
09:45 – 10:30	From strings on paper to signing space: Animating sign languages (Rosalee Wolfe)	
10:30 – 11:00	Coffee break	
11:00 – 11:45	Not just the hands – full on sign language recognition (Richard Bowden)	
11:45 – 12:30	Ethical open data principles: Share and care for your data, and don't forget to anonymise (Marc Schulder)	
12:30 – 13:00	Closing	

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(a) *EASIER merchandise* **(b)** *Welcome bags*

Figure 3.1: *Welcome and registration*

To advertise the workshop, a public homepage[2] was set up. The event was announced on the EASIER Homepage[3], in the EASIER newsletter and via several mailing lists and X (formerly Twitter) accounts, including the European Union of the Deaf, the Sign Language Linguistic List and the Kiez of Computing and Data Science[4]. Current research projects on SLs (including SignOn, ViCom, DGS-Korpus project) and several people of interest (this included Mandana Seyfeddinipur from the Endangered Languages Archive, Vadim Kimmelman from the University of Bergen, Ulrike Zeshan from University of Central Lancashire, Victoria Nyst from Leiden University, Eleftherios Avramidis from the DFKI, Necati Cihan Camgöz from Meta Reality Labs, and others) were contacted and asked to spread the invitation via their networks. Researchers whose datasets are represented in the Sign Language Dataset Compendium[5], as well as researchers contacting us with feedback about the Compendium, were invited personally.

One of the main goals of the workshop was to establish connections between the two target groups. Therefore, breaks were organised in a way that fostered networking and socialising. For all breaks between sessions we provided food on-site so that participants did not have to take care of organising supplies but could concentrate on exchanging with each other. On Monday evening we offered the possibility to jointly have dinner at a nearby restaurant. About 45 people took part.

3.1 PRESENTATIONS

The workshop started with two introductory sessions, one targeted towards the SL experts on basic knowledge about data sciences, the other targeted towards participants trained in language technologies, introducing SL linguistics. The first workshop day was organized in two

[2] https://www.sign-lang.uni-hamburg.de/easier/easier-autumn-school.html
[3] https://www.project-easier.eu/event/easier-autumn-school/
[4] https://datascience-hamburg.org/
[5] https://www.sign-lang.uni-hamburg.de/lr/compendium/

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(a) *Annika Herrmann presenting "101: Sign linguistics for data scientists"*

(b) *Johanna Mesch presenting "First things first: Things you have to think about when collecting sign language data"*

Figure 3.2: *Presentations*

parallel tracks, continuing the structure of the introductory sessions, but allowing participants to choose individual courses according to their personal background and interests. The last session of the day was a hands-on fair where participants could present their own work, data and tools in the form of posters and demos (see also Figure 3.3). 17 groups used this possibility and presented their work. The complete list of fair contributions can be found in Appendix A.2. The second day had a single track of sessions for all participants, independent of their professional background. The complete workshop syllabus can be found in Appendix A.1.

3.2 PARTICIPANTS

73 people registered to the workshop, 61 persons attended on-site, of which 15 were presenting one of the lessons (see Figure 3.4). Participants came from 17 different countries (see Figure 3.5). Of the 61 attendees, 14 named IS as their preferred language (see Figure 3.6).

3.3 FUNDING

We were able to offer financial conference support for up to 20 researchers in the fields of SL linguistics and data science (and related) that had no other funding available. In total a budget of 14,000 EUR was dedicated to the funding. The support was up to 700 EUR per researcher and aimed to partially reimburse travel expenses for attending the Autumn School.

13 researchers applied for the travel fund. Four were not eligible, one person withdrew the application and one person couldn't join the Autumn School due to health issues. In the end we funded seven researchers to attend the Autumn School with a total of about 4,400 EUR.

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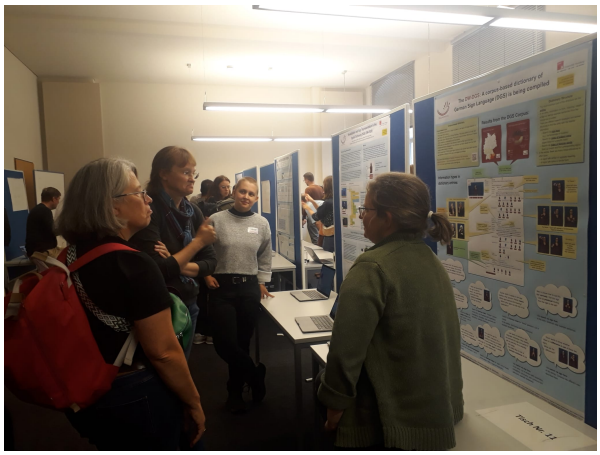
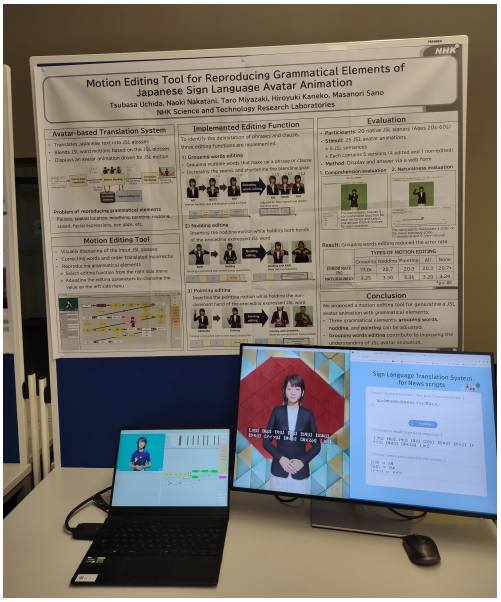
(a) *Hands-on Fair with 17 posters and demonstrations*



(b) *Posters by the DGS-Korpus project with lively discussions*



(c) *Poster and demonstration by Tsubasa Uchida about the NHK sign language avatar*

Figure 3.3: *Hands-on Fair*

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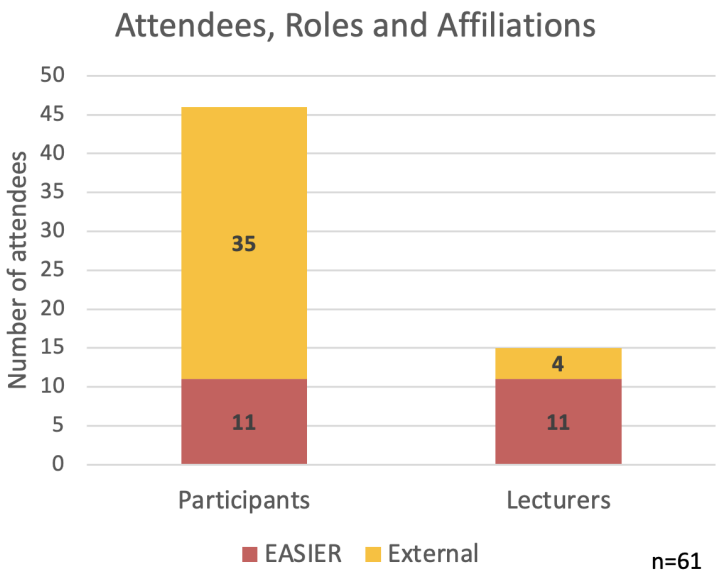

Figure 3.4: *Roles and affiliations of attendees*

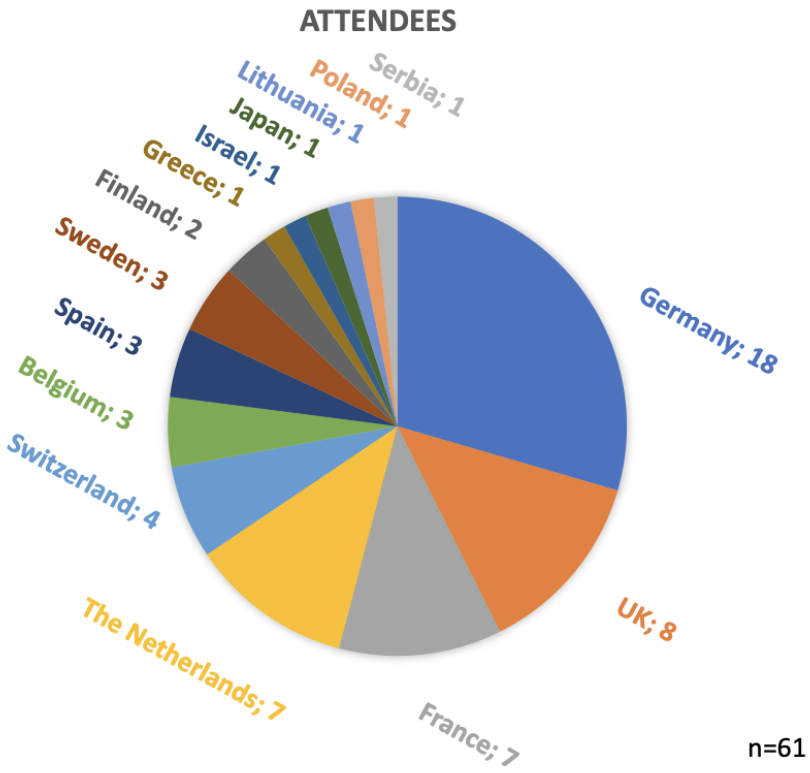

Figure 3.5: *Attendees and country of origin*

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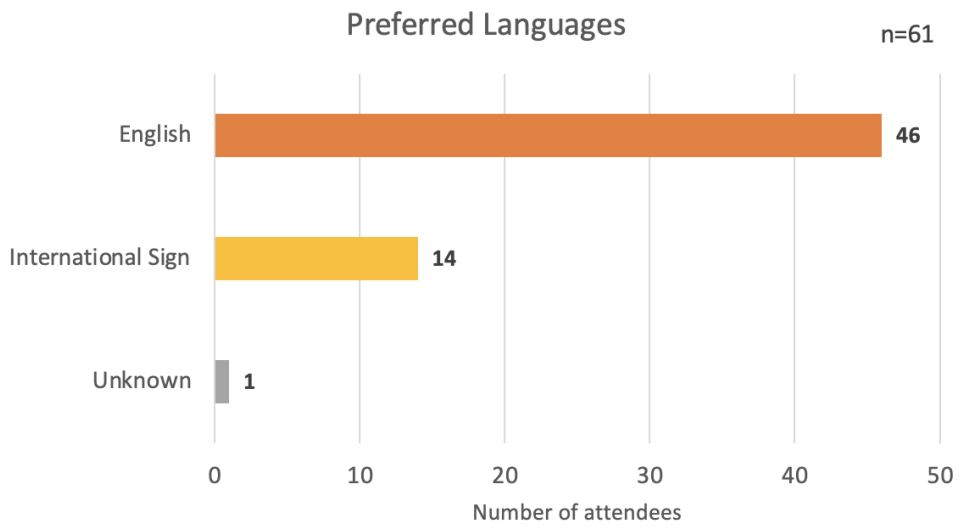

Figure 3.6: *Preferred languages of attendees*

Figure 3.7: *Participants and presenters*

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4 OUTCOME

The goal of increasing the scope of the developed technology to more European SLs was not only fulfilled by the training offered, but also by collaborations that were initiated at the Autumn School. Two participants showed specific interest in adding their data to The Multilingual Sign Language Wordnet[6] (Bigeard et al., 2022; Bigeard et al., 2023). Another researcher declared an interest in using the services offered by EASIER for data processing (Camgöz and Bowden, 2022). Independent of EASIER, two researchers plan to cooperate on the topic of specialised term dictionaries in the health domain.

Additionally, we created a homepage[7] where participants can access all materials from the Autumn School – the slides from the lectures and the posters from the hands-on fair. The majority of materials is openly accessible to everyone. Therefore, the EASIER Autumn School is also useful for people who could not attend at the time.

Last but not least, we want to share some of the impressions the participants of the Autumn School shared with us:

“[...] this consortium made a crucial turn in introducing new technologies to sign language users and their communities. The model of cooperation set by this project should be taken as a gold standard in working with deaf communities. The interchange and cooperation of small teams made up of linguists and computer scientists scattered around European universities was very promising and exciting to witness.”

“Participation in this workshop was important and useful. The knowledge I have gained will be very useful for my department and my country.”

“What made the Autumn School particularly noteworthy was its instruction in sign language. Reading about scientific topics related to sign language does not fully capture the essence for me; the ethical and cultural nuances intrinsic to sign language cannot be fully conveyed in purely written texts. Thus, the lectures on morphology and HamNoSys were enlightening, providing me with fresh perspectives on exploring the sign language lexicon and corpus.”

“Excited to share all knowledge I got with my colleagues and improve (and maybe start some new) projects back home.”

[6] https://www.sign-lang.uni-hamburg.de/easier/sign-wordnet/index.html
[7] https://www.sign-lang.uni-hamburg.de/easier/easier-autumn-school.html

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5 CONCLUSION

The EASIER Autumn School workshop was a two day event aiming to connect SL linguists and data scientists and teaching them about each others domain to further the development of SL technologies.

With 61 people present, 15 lectures and an interactive hands-on fair, as well as many new professional connections and potential collaborations established, the EASIER Autumn School was a successful and much praised event that helped to increase the reach of the technologies developed within the EASIER project and by workshop participants.

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A APPENDIX

A.1 SYLLABUS

101: Data science for sign language linguists
Thomas Hanke, University of Hamburg

With language data becoming ever bigger in their amount we need automatic processes to gain more insights into linguistic structures. In this class participants will learn about different techniques from the field of data science and natural language processing which might be of interest for their daily work. This course also lays a good basis for the subsequent sessions and off-line discussions.

First things first: Things you have to think about when collecting sign language data
Johanna Mesch, Stockholm University

Sign languages are collected in their true form only by video recordings. This class will look at different points that researchers and field workers have to think of when collecting sign language data. That is the technical aspects, like how many cameras are needed and where and how to store the data, as well as linguistic aspects, like what are the best ways to elicit spontaneous, natural signing. The talk will show examples from a gold-standard corpus.

101: Sign linguistics for data scientists
Annika Herrmann, University of Hamburg

Sign languages are fully-fledged natural languages. This session gives a general introduction into the topic of sign language linguistics, covering key aspects that differentiate sign languages from spoken languages, like the use of 3D space with multiple simultaneous articulators. The class will lay a ground for the subsequent sessions and off-line discussions.

Transcription: Improving the quality of annotation by using a lexical database
Kearsy Cormier, University College London

The session will look at different technologies used to transcribe and align sign language data and how to organize one's vocabulary. The workflow with a lexical database integrated in one's annotation work will be the key topic. Different kinds of lexical databases will be shown, to see how big the difference can be when looking at richness of the resources (only glosses, glosses and keywords, other information, as phonological transcripts, translations, examples, etc.). The concept of ID-glosses is introduced and different annotation conventions will be discussed.

Sequential and simultaneous: sign language morphology
Cornelia Loos, University of Hamburg

This session introduces sign language morphology and its key points: sequentiality and simultaneity.

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Making your dictionary useful beyond looking up signs and making it fit for automatic processing
Sarah Ebling, University of Zurich

Dictionaries are very useful tools for common language users. By adding some more content and offering a few more options (regarding download and license), a dictionary can become a even more valuable resource, useful not only for the common user but also for data scientists. This class will talk about the requirements for valuable dictionary resources and why we should take this aspect into account.

From signing space to strings on paper: writing down sign languages phonetically
Maria Kopf, University of Hamburg

This session introduces sign language phonetics and explains how the smallest building blocks of sign languages can be written down in a phonetic writing system such as HamNoSys.

Future technologies I: Using the power of Wordnet for dictionary work
Sam Bigeard, University of Hamburg

Wordnets are a powerful tool to represent the sense of a sign beyond providing keywords in a spoken language. They make dictionaries easier to explore, avoid mistranslation, and can augment your dictionary with images and translations in many languages. This session explains what a Wordnet is, how to use Wordnet, how to index your dictionary with Wordnet senses, and why you would want to go that extra mile.

Getting started with sign language data: Where do I find sign language data and how do I treat them – handling glosses, overfitting, and NLP tools
Thomas Hanke, University of Hamburg

This session introduces different kinds of sign language data and defines what minimal requirements for usable sign language resources are. Participants will learn what data already exist, what to consider when harvesting web data and how to recognize good quality data. The influence of the source language on the signed data will be discussed (interpreted spoken language vs. original signing).

Future technologies II: Make your data searchable with keywords, HamNoSys and the Super Spotter
Reiner Konrad & Maren Brumm, University of Hamburg

Finding one's way through big amounts of data can be difficult. This class will show how one can search a corpus with methods such as keywords, HamNoSys transcripts and future technology as sign spotting.

Do you like it? Gathering Feedback in an accessible way
Davy Van Landuyt, European Union of the Deaf

Gathering feedback for sign language technology differs in many aspects from gathering feedback for other technological tools. To really meet one's target group one has to think about the accessibility of common feedback systems. This class will show possible strategies to meet the signing community and offer possibilities for feedback in an accessible way, such as answering via video instead of text.

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Hands-on Fair
(everybody)

The Hands-on Fair invites participants and lecturers as well as EASIER project members to present and demonstrate their data and technology. For more context we ask every interested person to provide a poster with background information on the data or tool they present.

No MoCap, no problem – MediaPipe and OpenPose
Amit Moryossef, University of Zurich

Motion Capture data is very expensive in terms of production and the amount of available MoCap data is much smaller than simple video data. MediaPipe and OpenPose offer pose estimation for video data that can be used to process signing. This class will show how this technology works and what typical use cases are.

From strings on paper to signing space: Animating sign languages
Rosalee Wolfe, ATHENA Research Center

Displaying sign languages as output from MT systems is more difficult than displaying text of a spoken language because sign languages have no widely accepted written form. This presentation will cover sign language display strategies and discuss some of the interesting open questions regarding textual representations that promise the most effective support of sign language display.

Not just the hands – full on sign language recognition
Richard Bowden, University of Surrey

Signed languages are not just produced by the hands – face and body convey grammar and other important information. This session shows how these features can be automatically recognized and what common hurdles are.

Ethical open data principles: Share and care for your data, and don't forget to anonymise
Marc Schulder, University of Hamburg

This session addresses how data can be published in ways that are both open and ethical. It introduces the FAIR and CARE principles and how they apply to sign language data. This covers topics such as data access, usage licences, the importance of metadata and documentation, persistent identifiers, but also accountability, working with and for sign language communities and respecting participants rights through the use of informed consent and appropriate anonymisation of (meta)data.

A.2 POSTERS AND DEMOS (HANDS-ON FAIR)

Note: Authors present are marked in bold.

Camille Challant and **Michael Filhol**, CNRS & Université Paris-Saclay: *A First Corpus of AZee Discourse Expressions* (with demo)

Elena Jahn and **Reiner Konrad**, University of Hamburg: *iLex and ELAN compared* (with demo)

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Emmanuella Martinod, CNRS & Université Paris-Saclay: *AZeefication of illustrative SL*

Felicitas Otte, Anke Müller, **Gabriele Langer, Sabrina Wähl** and **Thomas Hanke**, University of Hamburg: Visualization and Sign Representation in the Digital Dictionary DGS *(DW-DGS)*

Joanna Wójcicka, University of Warsaw and Anna Kuder, University of Cologne: *The Annotation Process of Language Contact Phenomena in the PJM Corpus*

José Luis Alba, University of Vigo: *Spanish Sign Language Recognition: application and dataset* (with demo of SignaMed and LSE eSaude UVIGO)

Julie Lascar and **Michael Filhol**, CNRS & Université Paris-Saclay: *AZee Animator* (demo only)

Keniel Peart, Zixu Zhang, and **Shelly Vishwakarma**, University of Southampton: *British Sign Language Recognition Using Privacy Preserving Radar Technology*

Liesbet De Vos, University of *Namur: CCxG-Sign: Computational Construction Grammar for Sign Languages*

Marc Schulder, Sam Bigeard, Maria Kopf and **Thomas Hanke**, University of Hamburg: *The Sign Language Interchange Format. Harmonising Sign Language Datasets for Computational Processing* (with demo)

Maren Brumm and **Sam Bigeard**, University of Hamburg: *Semi-Automatic Subtitle Alignment for Sign Languages* (with demo)

Maria Kopf, Marc Schulder and **Thomas Hanke**, University of Hamburg: *The Sign Language Dataset Compendium. Creating an Overview of Digital Sign Language Resources* (with demo)

Michael Filhol and Thomas von Ascheberg, CNRS & Université Paris-Saclay: *The AZVD graphical editor* (demo only)

Rosalee Wolfe, Athena Research Center and John McDonald, DePaul University: *Tools for Linguistic Animation* (with demo)

Sabrina Wähl, Gabriele Langer, Felicitas Otte and Anke Müller, University of Hamburg: *The DW-DGW: A corpus-based dictionary of German Sign Language (DGS) is being compiled*

Sam Bigeard, Marc Schulder, Maria Kopf, Thomas Hanke, University of Hamburg and Kyriaki Vasilaki, Anna Vacalopoulou, Theodoros Goulas, Athanasia–Lida Dimou, Stavroula–Evita Fotinea and Eleni Efthimiou, Athena Research Center and Neil Fox and **Kearsy Cormier**, University College London and Onno Crasborn and Lianne Westenberg, Radboud University: *Introducing Sign Languages to a Multilingual Wordnet: Bootstrapping Corpora and Lexical Resources of Greek Sign Language and German Sign Language* (with demo)

Tsubasa Uchida, Naoki Nakatani, Taro Miyazaki, Hioryuki Kaneko and Masanori Sano, NHK Science and Technology Research Laboratories: *Motion Editing Toll for Reproducing Grammatical Elements of Japanese Sign Language Avatar Animation* (with demo)

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