

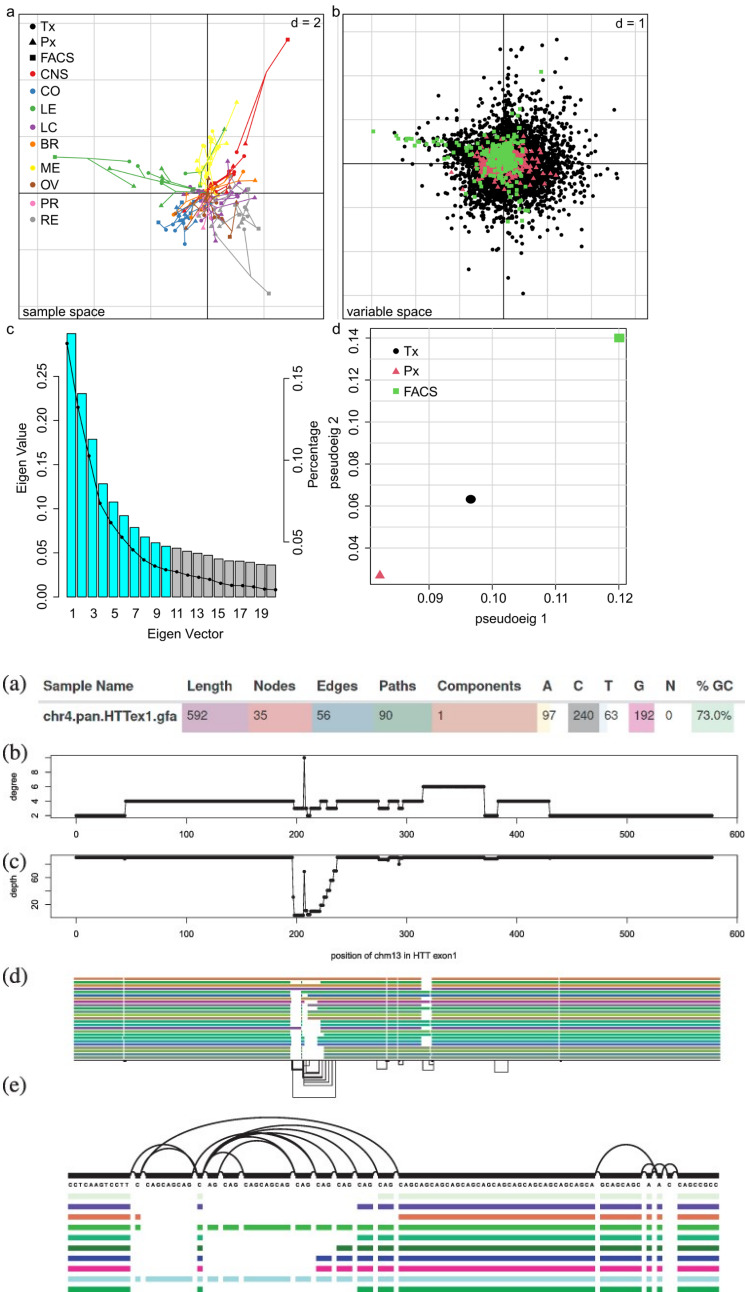
# Simon Heumos

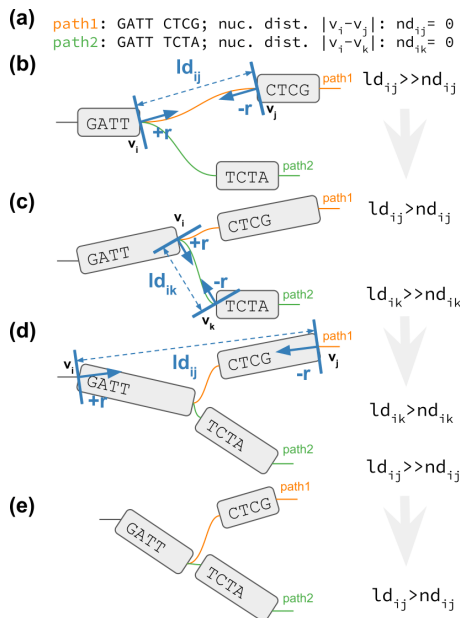


## Personal Details



I am finalizing my Ph.D. at the Quantitative Biology Center, Tübingen, with expertise in pangenomics and multiomics. I develop methods to analyze (pan)genomic variation, manage interdisciplinary projects, and create efficient tools like nf-core/pangenome for large-scale pangenomic analysis. I provide guidance to biomedical researchers on experimental design, data analysis, and multiomics integration. I also spearhead hackathons and workshops to foster innovation and knowledge-sharing within the bioinformatics community. Outside of work, I enjoy an active lifestyle and watching Sesame Street for a good laugh.





[Chat](#) | 
 [Publications](#) | 
 [Code](#) | 
 [ResearchGate](#) | 
 [ORCID](#) | 
 [Linkedin](#) | 
 [X](#) | 
 [nf-core/pangenome](#)



## Employment

1 Jun. 2019 to 30 Jun. 2024 (5 years)

PhD student at the [Quantitative Biology Center \(QBiC\)](#) (Tübingen, Germany).

Reporting to Prof. Sven Nahnsen.

- Pangenome graph software & research:
  - Developed [nf-core/pangenome](#), a cluster-efficient pipeline for constructing pangenome graphs without bias or exclusion, improving execution speed by 2-3 ([Heumos et al. 2024, Bioinformatics](#)) ([nf-core/pangenome](#))
  - Co-developed ODGI, the de-facto standard for pangenome graph analysis ([Guarracino\\*, Heumos\\* et al. 2022, Bioinformatics](#)) ([ODGI](#))
  - Designed and co-developed PG-SGD, a pangenome graph layout algorithm that achieved 10x faster performance and reduced memory usage by 2x, cutting layout calculation time from over a week to one day for human pangenomes ([Heumos\\*, Guarracino\\* et al. 2024, Bioinformatics](#)) ([PG-SGD](#))
  - Major contributor to the PanGenome Graph Builder ([Garrison\\*, Guarracino\\*, Heumos et al. 2024, Nature Methods](#)) ([PGGB](#))
  - Evaluating pangenome graphs ([PGGE](#))
  - Supporting efforts for efficient pangenome graph indices ([Balaz et al. 2024, LATIN2024: Theoretical Informatics](#))
  - Contributed to a [Pangenome Graphs](#) review ([Eizenga et al. 2020, Annual Review of Genomics and Human Genetics](#))
  - As an associate member of the Human Pangenome Reference Consortium I contributed to building the first draft human pangenome reference ([Liao\\*, Asri\\*, Ebler\\* et al. 2023, Nature](#))

- Industry collaboration with Computomics GmbH on coding a pangenome browser [Pantograph](#). Development of pangenome graph browser using React, MobX-State-Tree, JavaScript ( [Genome Graph Browser](#)).
- Experimenting towards an interface between RDF/SPARQL and pangenome graphs together with Jerven Bollemann and Toshiyuki T. Yokoyama winning an ISMB 2020 [Best Poster Award: Semantic Variation Graphs: Ontologies for Pangenome Graphs](#)
- Multiomics analysis of the NCI-60 tumor cell panel ([Heumos\\*](#), [Dehn\\*](#) et al. 2022, [Cancer Cell International](#)) ( [QMSFC](#)):
  - Crawling and integrating multiomics data from resources like TCGA
  - Differential expression analysis of RNA-Seq data
  - Integrative analysis of transcriptomic microarray data (Affymetrix)
  - Curation, quality control, differential expression analysis of Fluorescence Activated Cell Sorting (FACS) data
  - Proteomics and phosphoproteomics data curation, and differential expression analysis
  - Reverse Phase Protein Array (RPPA) differential expression analysis
- Organizer, tutor, and chair of international hackathons and workshops
- Managing virtual machines and users in QBiC's deNBI cloud instances
- Organization of retreats
- Mentoring undergraduates
- Learning ONT sequencing and base calling at PANGAIA's Winter Wet Lab school

 1 Jun. 2017 to 30 May 2019 (2 years)

 **Research assistant at the [Quantitative Biology Center \(QBiC\)](#)** (Tübingen, Germany).

 Reporting to Dr. Stefan Czemmel

 [Employer's reference](#)

- Member of bioinformatics support and project management team (BioPM)
- Bridge function to the infrastructure and scientific software team
- Counseling of biomedical researchers on experimental design, data analysis, and paper writing
- FACS data analysis
- Proteomics LFQ data analysis
- Germline variants analyses on whole-genome sequencing (WGS) data: Quality control, read trimming and mapping, variant calling, and functional prediction
- Compilation of highly standardized and reproducible bioinformatics pipelines
- Excellent customer service when performing data processing and statistical analysis of big biomedical data
- Initiation and maintenance of a QBiC report template for analysis results
- Driving force behind standardized SOPs to improve QBiC's infrastructure
- Shaped research grant application at the Ministry for Economics and Energy (BMWi) titled

PANTOGRAPH acquiring 190,000€ for researching pangenome graph visualization

- Supervision of student projects
- After 1 year: Vice coordinator of the BioPM team

📅 1 Nov. 2016 to 31 May 2017 (7 months)

🏢 Master student at the **Computomics GmbH** (Tübingen, Germany)

👤 Reporting to Björn Geigle and Dr. Jörg Hagmann

📄 Thesis *Interactive Visualization of Genome Variation Graphs*

📊 Evaluation: 1.0

🏆 ISMB 2017 Best Poster Prize *Interactive pangenome visualization using variant graphs*

🔧 Tooling: Interactive full-stack web application with Node.js, nbind to make C++ VG accessible in JavaScript, Pug, D3, HTML, CSS (🔗 [AG](#))

📅 1 Jun. 2015 to 31 Sep. 2016 (1 year, 2 months)

🏢 Research student at the **Max Planck Institute for the Science of Human History** (Jena, Germany)

👤 Reporting to Dr. Alexander Herbig in the **Computational Pathogenomics** research group

- Development of bioinformatics programs for the analysis of paleogenetic NGS data (🔗 [GenConS](#))  
(📄 [Fellows Yates et al. 2017, Scientific Reports](#))

📅 1 Sep. 2014 to 31 May 2015 (11 months)

🏢 Research student at the **Institute for Archaeological Sciences** (Tübingen, Germany)

👤 Reporting to Dr. Alexander Herbig in the Paleogenetics research group

- Performance of system administration tasks and development of bioinformatics programs for the analysis of paleogenetic NGS data

📅 1 Jul. 2014 to 30 Aug. 2014 (1 year, 1 month)

🏢 Research student at the **MFT Services** (Tübingen, Germany)

👤 Reporting to Dr. Günter Jäger in the Medical Genetics research group

- Analysis of RNA-Seq data

📅 1 Jun. 2013 to 31 Mar. 2014 (10 months)

🏢 Research student at the **Centre for Bioinformatics** (Tübingen, Germany)

👤 Reporting to Prof. Kay Nieselt in the Integrative Transcriptomics research group

- Analysis of RNA-Seq data and extension of an in-house developed Java tool for the analysis of RNA-Seq data

📅 1 Aug. 2010 to 31 Aug. 2010 (1 month)


📅 1 Aug. 2011 to 31 Aug. 2011 (1 month)

📅 1 Aug. 2012 to 31 Aug. 2012 (1 month)

🔧 Temporary shipping assistant at **WALDNER** (Wangen, Germany)

- Packaging small part materials and transporting them to the loading area

📅 1 Jul. 2009 to 31 Mar. 2010 (9 months)

 Alternative service as an ambulance man at the **DRK Rettungsdienst Bodensee-Oberschwaben gGmbH** (Ravensburg, Germany)

- Operations took place both in the ambulance and in the patient transport vehicle

 1 Feb. 2007 to 31 Jul. 2010 (3 years, 5 months)

 Side job at the **PEKANA Naturheilmittel GmbH** (Kisslegg, Germany)

- Assistant for office, shipping, and pharmaceutical packaging tasks

## Education

 1 Jun 2019 to 28 Mar 2025

 PhD student at the **Quantitative Biology Center (QBiC)** (Tübingen, Germany).

 Reporting to Prof. Sven Nahnsen.

- Thesis *Computational methods for pangenomics and multiomics integration*

 1 May 2014 to 30 May 2017

 MSc Bioinformatics at the **University of Tübingen** (Tübingen, Germany).

 [MSc certificate](#)

- Major fields:
  - NGS
  - RNA Biology
  - Java + JavaFX development
  - Data management in quantitative biology
- Thesis [Interactive Visualization of Genome Variation Graphs](#) at Computics GmbH: 1.0

 1 Oct 2010 to 30 Apr 2014

 BSc Bioinformatics at the **University of Tübingen** (Tübingen, Germany).

 [BSc certificate](#)

- Major fields:
  - Functional programming with Scheme
  - Basics Bioinformatics
  - Java + JavaSwing development
  - Linux
- Thesis [TOPAS - TOolkit for Processing and Annotating Sequence data](#): 1.3











 1 Aug 2000 to 30 Jun 2009














 Abitur (Wangen, Germany).








 [School certificate](#)

# Publications





















\*first authorship

|  Journal             |  Title                         |  Contribution   |  Links                   |
|---|---|--|---|
| Bioinformatics, 2024  | Cluster-efficient pangenome graph construction with nf-core/pangenome   | Pipeline conception, software development, testing, documentation, design and conduction of experiments, paper writing   |  <a href="#">Paper</a>   |
| SC24: International Conference for High Performance Computing, Networking, Storage and Analysis, 2024 | Rapid GPU-Based Pangenome Graph Layout  | Guidance on algorithm implementation, feedback of the cache optimized CPU and GPU implementations, read & criticized & edited manuscript   |  <a href="#">Paper</a>   |
| PLOS Computational Biology, 2024  | nf-core/airrflow: an adaptive immune receptor repertoire analysis workflow employing the Immcantation framework | Software development, paper editing  |  <a href="#">Paper</a> |
| Nature Methods, 2024  | Building pangenome graphs   | Software development, documentation, testing, contributed to Figure 1, wrote Section A1, made Figure A1, and contributed to paper writing and editing  |  <a href="#">Paper</a> |
| Bioinformatics, 2024  | *Pangenome graph layout by Path-Guided Stochastic Gradient Descent  | Algorithm implementation leader, testing, documentation, design and conduction of experiments, paper writing   |  <a href="#">Paper</a> |
| LATIN 2024: Theoretical Informatics, 2024   | Wheeler Maps  | Advisor for the integration of a wheeler maps implementation with real life pangenome graphs, built and provided initial pangenome graphs for testing the implementation, manuscript editing |  <a href="#">Paper</a> |

























|  Journal |  Title   |  Contribution  |  Links                   |
|---|---|---|---|
| Acta Neuropathologica, 2023   | Integrative proteomics highlight presynaptic alterations and c-Jun misactivation as convergent pathomechanisms in ALS             | Paper editing, LFQ proteomics analysis  |  <a href="#">Paper</a>   |
| Nature, 2023  | A draft human pangenome reference   | Paper editing, pangenome graph creation and visualization   |  <a href="#">Paper</a>   |
| <b>Cancer Cell International, 2022</b>  | <b>*Multiomics surface receptor profiling of the NCI-60 tumor cell panel uncovers novel theranostics for cancer immunotherapy</b> | <b>Data curation and quality control, performed the MCIA, RNAseq analysis and TCPA data exploration, wrote methods sections of the software tools and steps I applied, generated visualizations for Figures 1-3, and manuscript editing</b> |  <a href="#">Paper</a>   |
| <b>Bioinformatics, 2022</b>   | <b>*ODGI: understanding pangenome graphs</b>  | <b>Paper and documentation writing, performance evaluation, testing, implemented several tools</b>  |  <a href="#">Paper</a>   |
| Frontiers in Plant Science, 2022  | A Perspective on Plant Phenomics: Coupling Deep Learning and Near-Infrared Spectroscopy   | Experimental counseling, data management  |  <a href="#">Paper</a>  |
| Frontiers in Immunology, 2020   | Specific Induction of Double Negative B Cells During Protective and Pathogenic Immune Responses                                   | Data curation   |  <a href="#">Paper</a> |
| Bioinformatics, 2020  | Efficient dynamic variation graphs  | Implementation of some ODGI subcommands (pathindex, server, panpos), optimization of one (bin), documentation writing for ODGI  |  <a href="#">Paper</a> |
| Annual Review of Genomics and Human Genetics, 2020  | Pangenome Graphs  | I made Table 1 and contributed to Sections 4.4 and 6.1 and Figure 2, paper editing  |  <a href="#">Paper</a> |
| Frontiers in Immunology, 2019   | Platelets Aggregate With Neutrophils and Promote Skin Pathology in Psoriasis  | FACS data analysis  |  <a href="#">Paper</a> |

|  Journal |  Title   |  Contribution   |  Links                 |
|---|---|--|---|
| Frontiers in Immunology, 2019   | PSM Peptides From Community-Associated Methicillin-Resistant <i>Staphylococcus aureus</i> Impair the Adaptive Immune Response via Modulation of Dendritic Cell Subsets <i>in vivo</i> | Statistical analysis counseling, paper editing   |  <a href="#">Paper</a> |
| Nature Scientific Reports, 2017   | Central European Woolly Mammoth Population Dynamics: Insights from Late Pleistocene Mitochondrial Genomes   |  <a href="#">GenConS</a> software development and testing, wrote section about GenConS, paper editing |  <a href="#">Paper</a> |







## Talks & Posters







|  Time |  Conference |  Title |  Links   |
|--|--|---|---|
| 30 June 2024 to 4 July 2024  | <a href="#">International Genome Graph Symposium 2024</a>                                    | Cluster efficient pangenome graph construction with nf-core/pangenome                   |  <a href="#">Talk</a><br> <a href="#">Certificate</a>   |
| 8 Apr. 2024  | HPRC <a href="#">HUGO24</a> Workshop Rome  | Building and Analyzing Pangenome Graphs   |  <a href="#">Talk</a>   |
| 22 Mar. 2024   | <a href="#">M3 Workshop</a>  | Cluster efficient pangenome graph construction with nf-core/pangenome                   |  <a href="#">Talk</a>  |
| 7 Nov. 2023  | <a href="#">nf-core community</a> , virtual  | Cluster scalable pangenome graph construction with nf-core/pangenome                    |  <a href="#">Bytesize:nf-core/pangenome</a><br> <a href="#">Youtube</a><br> <a href="#">Talk</a>   |
| 19 Oct. 2023   | <a href="#">Nextflow Summit 2023</a>   | Cluster scalable pangenome graph construction with nf-core/pangenome                    |  <a href="#">Youtube</a><br> <a href="#">Talk</a>   |
| 23 Jun. 2023   | <a href="#">TÜBMI 2023</a>   | Pangenome Graphs  |  <a href="#">Poster</a>  |
| 8 Jul. 2022  | <a href="#">Biomedical Data Science Symposium</a>  | Pangenome Graphs  |  <a href="#">Poster</a>  |
| 6 July 2022  | <a href="#">International Genome Graph Symposium 2022</a>                                    | Graph layout by path-guided stochastic gradient descent                                 |  <a href="#">Talk</a><br>(Due to a car accident, <a href="#">Erik Garrison</a> hold the talk.)   |
| 8 Jul. 2022  | <a href="#">VIZBI 2022</a>   | Graph Layout by Path-Guided Stochastic Gradient Descent                                 |  <a href="#">Abstract</a><br> <a href="#">Poster</a><br> <a href="#">VIZBI Posters</a><br> <a href="#">Lightning Talk</a> |






|  Time |  Conference |  Title |  Links   |
|--|--|---|---|
| 21 Oct. 2021   | <a href="#">Institute for Medical Biometry and Bioinformatics</a>                            | Exploring pangenome graphs and possible applications                                    |  <a href="#">Talk</a>  |
| 21 Sept. 2021 to 24 Sept. 2021   | <a href="#">AGI2021 Congress</a>   | A pangenome for the expanded BXD family of mice   |  <a href="#">Abstract</a><br> <a href="#">Poster</a>  |
| 6 Sept. 2021 to 8 Sept. 2021   | <a href="#">German Conference on Bioinformatics 2021</a>                                     | ODGI: scalable tools for pangenome graphs   |  <a href="#">Abstract</a><br> <a href="#">Talk</a>  |
| 21 Jul. 2021   | <a href="#">TüBiT 2021</a>   | The PanGenome Graph Builder   |  <a href="#">Poster</a>  |
| 11 May 2021 to 14 May 2021   | <a href="#">The Biology of Genomes 2021</a>  | The PanGenome Graph Builder   |  <a href="#">Abstract</a><br> <a href="#">Poster</a>  |
| 28 Sep. 2020 to 1 Oct. 2020  | <a href="#">EG VCBM 2020</a>   | Graph Layout by Path-Guided Stochastic Gradient   |  <a href="#">Abstract</a><br> <a href="#">Poster</a>  |
| 21 Sep. 2020 to 23 Sep. 2020   | <a href="#">T2T-HPRC-Virtual Conference 2020</a>   | Graph Layout by Path-Guided Stochastic Gradient   |  <a href="#">Abstract</a><br> <a href="#">Poster</a>  |
| 13 Jul. 2020 to 16 Jul. 2020   | <a href="#">ISMB 2020</a>  | Pantograph: Scalable Interactive Graph Genome Visualization                             |  <a href="#">Abstract</a><br> <a href="#">Poster</a>   |
| 13 Jul. 2020 to 16 Jul. 2020   | <a href="#">ISMB 2020</a>  | Semantic Variation Graphs - A Pangenome Ontology  |  <a href="#">Abstract</a><br> <a href="#">Poster</a><br> <a href="#">Best Poster Prize</a><br> <a href="#">Citation</a> |
| 9 Dec. 2019 to 12 Dec. 2019  | <a href="#">SWAT<sup>4</sup>HCLS</a>   | Semantic Genome Graphs  |  <a href="#">Poster</a>  |
| 1 Sept. 2019   | <a href="#">Japan DBCLS Biohackathon 2019 Symposium</a>                                      | VG Browser: Interactive Visualization of Genome Variation Graphs                        |  <a href="#">Talk</a>  |

## Awards














|  Time |  Place |  Description |  Links   |
|--|---|---|---|
| 4 Jul. 2024  | <a href="#">International Genome Graph Symposium 2024</a>                                 | Student Travel Award 700 CHF (720.32 EUR)   |  <a href="#">Travel Award</a>                            |
| 16 Jul. 2020   | <a href="#">ISMB 2020</a>   | Best Poster Award <i>Semantic Variation Graphs: Ontologies for Pangenome Graphs</i>             |  <a href="#">Bio-Ontologies COSI – Best Poster Award</a> |









|  Time |  Place |  Description |  Links                             |
|--|---|---|---|
| 24 Jul. 2017   | ISMB 2017   | Best Poster Award <i>Interactive pang genome visualization of variant graphs</i>              |  <a href="#">Best Poster Award</a> |
| 8 Oct. 2012  | iGEM 2012   | Bronze Award  |  <a href="#">MISSING</a>           |

## \$ Grants





















|  Time |  Sponsor | \$ Amount   |  Description                              |
|--|---|-------------|--|
| 4 July 2024  | <a href="#">Ministry of Economics and Energy (BMW)</a>                                    | 190,000 EUR | Research grant <i>Pantograph</i> together with <a href="#">Computomics GmbH</a> to research pang genome graph visualization. |





## Invitations

|  Time |  Place  |  Description |  Links  |
|--|--|---|--|
| 18 May 2024 to 22 May 2024   | MemPanG24<br>Pangenomics,<br><a href="#">University of Tennessee Health and Science Center</a> , Memphis, USA                                      | Invited <b>Organizer, instructor, and chair</b>   |  <a href="#">Webpage</a><br> <a href="#">Material</a><br> <a href="#">Certificate</a>    |
| 8 Apr. 2024  | HPRC<br>Pangenomics Workshop at HUGO 2024, <a href="#">Aula Multimediale Rettorato</a> , Sapienza <a href="#">University of Rome</a> , Rome, Italy | Invited <b>Instructor</b>   |  <a href="#">Material</a><br> <a href="#">Slides</a><br> <a href="#">Certificate</a>  |
| 30 May 2023 to 2 Jun. 2023   | MemPanG23<br>Pangenomics,<br><a href="#">University of Tennessee Health and Science Center</a> , Memphis, USA                                      | Invited <b>Organizer, instructor, and chair</b>   |  <a href="#">Webpage</a><br> <a href="#">Material</a><br> <a href="#">Certificate</a> |




|  Time |  Place |  Description                           |  Links   |
|--|---|---|---|
| 7 Nov. 2023  | nf-core community, virtual  | Invited talk nf-core bytesize talks 2023<br><i>Cluster scalable pangenome graph construction with nf-core/pangenome</i> |  <a href="#">Bytesize:nf-core/pangenome</a><br> <a href="#">Youtube</a><br> <a href="#">Slides</a> |
| 21 October 2021  | <a href="#">Institute for Medical Biometry and Bioinformatics</a>                       | Invited talk <i>Exploring pangenome graphs and possible applications</i>  |  <a href="#">Slides</a>  |

## > Hackathons

|  Time |  Info |  What |  Links   |
|--|--|--|---|
| 18 Mar. 2024 to 20 Mar. 2024   | <a href="#">nf-core hackathon</a> , virtual  | Co-team leader group pipelines, finalizing nf-core/pangenome                           |  <a href="#">nf-core/pangenome</a>   |
| 16 Oct. 2023 to 18 Oct. 2023   | <a href="#">nf-core hackathon</a> , Barcelona, Spain                                   | Progressing nf-core/pangenome  |  <a href="#">projects</a><br> <a href="#">nf-core/pangenome</a>   |
| 27 Mar. 2023 to 29 Mar. 2023   | <a href="#">nf-core hackathon</a> , virtual  | Progressing nf-core/pangenome  |  <a href="#">projects</a><br> <a href="#">nf-core/pangenome</a>  |
| 16 Mar. 2022 to 18 Mar. 2022   | <a href="#">nf-core hackathon</a> , virtual  | Progressing nf-core/pangenome  |  <a href="#">nf-core/pangenome</a>   |
| 9 Dez. 2021 to 10 Dez. 2021  | <a href="#">Pangenomics BioHacking</a> , Online, Virtual in Milano                     | Expert for pangenome graph construction and participant                                |  <a href="#">nf-core/pangenome matrix</a><br> <a href="#">Certificate</a>   |
| 8 Nov. 2021 to 12 Nov. 2021  | <a href="#">ELIXIR Europe Biohackathon</a> , Barcelona, Spain                          | Progressing nf-core/pangenome  |  <a href="#">nf-core/pangenome</a>   |
| 22 Mar. 2021 to 24 Mar. 2021   | <a href="#">nf-core hackathon</a> , virtual  | Starting nf-core/pangenome   |  <a href="#">Projects</a><br> <a href="#">HackMD</a><br> <a href="#">nf-core/pangenome</a> |
| 9 Nov. 2020 to 13 Nov. 2020  | <a href="#">ELIXIR Europe Biohackathon</a> , virtual                                   | Project leader <i>Federated Interoperable Annotated Variation Graphs</i>               |  <a href="#">Projects</a><br> <a href="#">Federated Interoperable Annotated Variation Graphs</a>  |
| 2 Aug. 2020 to 14 Aug. 2020  | Crusco Biohackathon, Lavello, Italy  | Progressing PG-SGD with Andrea Guarracino and Erik Garrison                            |  <a href="#">1D PG-SGD</a><br> <a href="#">2D PG-SGD</a>  |

|  Time |  Info |  What |  Links   |
|--|--|--|---|
| 5 Apr. 2020 to 11 Apr. 2020  | <a href="#">COVID-19 Biohackathon</a> , virtual  | Co-Project leader Pangenome Browser and co-project leader Pangenome Ontology           | <a href="#">🔗 COVID-19 Biohackathon 2020</a><br><a href="#">🔗 Pangenome Browser</a><br><a href="#">🔗 Semantic Variation Graphs</a>  |
| 21 Nov. 2019 to 26 Nov. 2019   | <a href="#">Computomics GmbH</a> , Tübingen, Germany                                   | Progressing Pantograph, playing around with pangenome graphs and SPARQL                | <a href="#">🔗 Graph-Genome</a>  |
| 1 Sep. 2019 to 7 Sep. 2019   | <a href="#">NBDC DBCLS BioHackathon 2019</a> , Fukuoka, Japan                          | Co-Project leader Pantograph, playing around with SequenceTubeMap and SPARQL           | <a href="#">🔗 Hackathon Wiki</a><br><a href="#">🔗 Project Overview</a><br><a href="#">🔗 Graph-Genome</a><br><a href="#">🔗 MatrixTubeMap</a><br><a href="#">🐦 A SPARQLing MatrixTubeMap</a><br><a href="#">📄 Certificate</a> |







## Programming Languages

|  Start |  Language |  Projects  |
|---|--|---|
| 1 Oct. 2010   | Scheme   | Learning to code during my first three semesters BSc Bioinformatics   |
| 1 Apr. 2011   | Java   | BSc thesis <i>TOPAS - TOolkit for Processing and Annotating Sequence data</i> ( <a href="#">🔗 TOPAS</a> )   |
| 1 Apr. 2011   | Bash   | Contributing to the PanGenome Graph Builder ( <a href="#">🔗 PGGB</a> ). Implementing the PanGenome Graph Evaluation tool ( <a href="#">🔗 PGGE</a> ).                |
| 1 Oct. 2012   | R  | Performing multiomics analysis ( <a href="#">🔗 QMSFC</a> ).   |
| 1 Oct. 2012   | Python   | Implementing an ODGI MultiQC module ( <a href="#">🔗 ODGI MultiQC Module</a> ). Supervision of graph genome browser implementation ( <a href="#">🔗 Pantograph</a> ). |






| 📅 Start      | 💻 Language | 🔗 Projects   |
|--------------|------------|--|
| 5 Nov. 2016  | Javascript | Supervision of graph genome browser implementation ( <a href="#">Pantograph</a> ). Interactive full-stack web application with Node.js, nbind to make C++ VG accessible in JavaScript, Pug, D3, HTML, CSS ( <a href="#">AG</a> ) |
| 5 Nov. 2016  | C++        | Main contributor to <a href="#">ODGI</a> , <a href="#">smoothxg</a> .  |
| 1 Nov. 2020  | Nextflow   | Sole developer of <a href="#">nf-core/pangenome</a> .  |
| 26 Jan. 2021 | Rust       | GAF alignment evaluation tool ( <a href="#">rs-peanut</a> )  |

## 👥 Teaching













| 📅 Time                       | 📖 Course  | ✍️ Role   | 🔗 Links  |
|------------------------------|---|---|--|
| 18 May 2024 to 22 May 2024   | MemPanG24 Pangenomics, <a href="#">University of Tennessee Health and Science Center</a> , Memphis, USA   | <b>Organizer, instructor</b> , and <b>chair</b> , created new material and tutorials, held lessons, assisted the participants, tested the VMs | <a href="#">Webpage</a><br><a href="#">Material</a><br><a href="#">Certificate</a> |
| 8 Apr. 2024                  | HPRC Pangenomics Workshop at HUGO 2024, <a href="#">Aula Multimediale Rettorato</a> , <a href="#">Sapienza University of Rome</a> , Rome, Italy | <b>Instructor</b> , updated material and tutorials, held lessons, assisted the participants   | <a href="#">Material</a><br><a href="#">Slides</a><br><a href="#">Certificate</a>  |
| 22 Mar. 2024                 | M3 Pangenome Workshop, <a href="#">M3 Research Center</a> , <a href="#">University of Tübingen</a> , Tübingen, Germany                          | <b>Speaker</b> , live demonstration of <a href="#">nf-core/pangenome</a>  | <a href="#">Slides</a>   |
| 30 May 2023 to 2 Jun. 2023   | MemPanG23 Pangenomics, <a href="#">University of Tennessee Health and Science Center</a> , Memphis, USA   | <b>Organizer, instructor</b> , and <b>chair</b> , created new material and tutorials, held lessons, assisted the participants                 | <a href="#">Webpage</a><br><a href="#">Material</a><br><a href="#">Certificate</a> |
| 17 Apr. 2023 to 29 Jul. 2023 | Biomedical Data Management, <a href="#">University of Tübingen</a> , <a href="#">Quantitative Biology Center (QBiC)</a> , Tübingen, Germany     | <b>Tutor</b> , managed seminar, hold tutorials, exam assistant  | NA   |

|  Time |  Course  |  Role |  Links                    |
|--|---|--|--|
| 19 Apr. 2022 to 30 Jul. 2022   | Grundlagen der Bioinformatik, <a href="#">University of Tübingen, Quantitative Biology Center (QBiC)</a> , Tübingen, Germany  | <b>Tutor</b> , hold tutorials, revised and updated practical lessons, exam grader        |  <a href="#">Teaching</a> |
| 21 Mar. to 25 Mar. 2022  | Advanced Bioinformatics: Data Mining and Data Integration for Life Science (1.5 CFU/ECTS), Master's degree, <a href="#">Utrecht Bioinformatics Center</a> , Utrecht, Netherlands) | <b>Tutor</b> , assisting students in the practical lessons                               |  <a href="#">Webpage</a>  |
| 20 Apr. 2020 to 25 Jul. 2020   | Data Management for Quantitative Biology, <a href="#">University of Tübingen, Quantitative Biology Center (QBiC)</a> , Tübingen, Germany  | <b>Tutor</b> , managed seminar, hold tutorials, exam assistant                           | NA   |







## Mentoring

|  Time |  University  |  Thesis |  Links                  |
|--|---|--|--|
| 1 Oct. 2023 to 31 Mar. 2024  | Master's degree in Bioinformatics, <a href="#">University of Tübingen, Quantitative Biology Center (QBiC)</a> , Tübingen, Germany   | Joining medical data and pangenome graphs using the semantic web                         |  <a href="#">OXIQLE</a> |
| 1 May 2023 to 30 Aug. 2023   | Bachelor's degree in Bioinformatics, <a href="#">University of Tübingen, Quantitative Biology Center (QBiC)</a> , Tübingen, Germany | Die Konstruktion eines <i>Lodderomyces elongisporus</i> Pangenomgraphen                  | NA   |

## Courses

|  Time |  Place  |  Title            |  Links   |
|--|--|--|---|
| 1 Feb. 2023 to 8 Feb. 2023   | Comenius University in Bratislava, Faculty of Natural Sciences (wet lab), and Faculty of Mathematics, Physics and Informatics (analysis), Bratislava, Slovakia | PANGAIA Winter Wet Lab School  |  <a href="#">PANGAIA WWL School 2023</a><br> <a href="#">Invitation</a> |
| 8 Jul. 2022  | University of Tübingen, Quantitative Biology Center (QBiC), Tübingen, Germany  | Biomedical Data Science Symposium  |  <a href="#">Biomedical Data Science Symposium 2022</a>  |
| 11 Apr. 2019 to 12 Apr. 2019   | University of Tübingen, Quantitative Biology Center (QBiC), Tübingen, Germany  | Nextflow Workshop  |  <a href="#">Nextflow Workshop April 2019</a>  |
| 12 Nov. 2017 to 14 Nov. 2017   | EMBL Heidelberg, Germany   | EMBO   EMBL Symposium: From Single- to Multiomics: Applications and Challenges in Data Integration |  <a href="#">Certificate</a>   |
| 25 Sep. 2017 to 29 Sep. 2017   | Leibniz Institute of Plant Biochemistry, Halle (Saale)   | Joint CIBI user meeting 2017 on OpenMS, MetFrag and SeqAn  |  <a href="#">Certificate</a>   |
| 18 Sep. 2017   | University of Tübingen, Quantitative Biology Center (QBiC), Tübingen, Germany  | 2 <sup>nd</sup> Annual European Bioinformatics Core Community Workshop                             |  <a href="#">Certificate</a>   |
| 5 Oct. 2012 to 8 Oct. 2012   | Vrije Universiteit, Amsterdam, Netherlands   | iGEM 2012 European Regional Jamboree   |  <a href="#">Wiki</a>  |

## Misc

|  Time |  Info |  What |  Links                           |
|--|--|--|---|
| 13 Jun. 2024 to Present  | <a href="#">United Kingdom Research and Innovation</a>                                 | Reviewer for <b>UK Research and Innovation</b>   |  <a href="#">Funding Service</a> |
| 15 Jun. 2022 to Present  | <a href="#">Oxford Bioinformatics</a>  | Reviewer for <b>Oxford Bioinformatics</b>  | NA  |
| 12 Oct. 2020 to Present  | <a href="#">Human Pangenome Reference Consortium</a>                                   | Associate Member of the <b>Human Pangenome Reference Consortium</b>                    |  <a href="#">Collection</a>      |