Annachiara Korchmaros

Leipzig, Germany
✉ annachiara@bioinf.uni-leipzig.de
🖰 http://akorchmaros.com/

Research Experience

June 2021 - present
Career break for maternity leave

Universität Leipzig - Leipzig, Germany
Postdoctoral Researcher
Bioinformatics Leipzig
○ Studying best match graphs, their generalizations, and applications to bioinformatics

December 2019 - May 2021

Aalto University - Espoo, Finland
Postdoctoral Researcher
Department of Mathematics and Systems Analysis
○ Studied the structure of 2-colored best match graphs
○ Estimated neuronal manifold dimension
○ Reconstructed 3D DNA structure of diploid organisms
○ Studied phylogenetics networks

August 2018 - August 2019

Child Mind Institute - New York, US
Data Analyst
Center for the Developing Brain
○ Studied how to improve the reliability of fMRIs
○ Investigated the impact of functional alignment on the reliability of fMRIs
○ Manually cleaned brain image databases
○ Explored new strategies to improve current software packages
○ Biweekly presented research findings to other teams

Dec - May 2017

Georgia Institute of Technology - Atlanta, US
School of Biology, Giboson Lab
○ Implemented a linear regression model to estimate the average cell-type specific gene expressions in blood given cell counts and total gene expressions
○ Analyzed and cleaned microarray datasets from different platforms

February - April 2016

Georgia Institute of Technology - Atlanta, US
School of Biology, Lachance Lab
○ Managed human genome datasets of admixed individuals
○ Studied risk scores with MATLAB

Teaching Experience

August 2015 - May 2017

Georgia Institute of Technology - Atlanta, US
Graduate Teaching Assistant
School of Mathematics
○ Simplified mathematical concepts for one-on-one tutoring
○ Assisted students during small-group learning periods
○ Planed and executed lessons for up to 60 students
○ Graded all assignments and exams

Education

May 2017

Georgia Institute of Technology, Atlanta, GA
M.S. in Bioinformatics
Overall GPA - 3.91

February 2015	**University of Basilicata, International Doctoral Seminar JÁNOS BOLYAI, Potenza, Italy** Ph.D. in Mathematics 110/110 Cum Laude Thesis: Permutations and Sorting Problems Associated Institutes: University of Campania, University of Perugia, University of Szeged
September 2011	**University of Perugia, Perugia, Italy** M.S. in Mathematics 110/110 Cum Laude Thesis: Alignments of DNA Sequences Studied within Tropical Mathematics
February 2009	**University of Perugia, Perugia, Italy** B.S. in Mathematics 110/110 Cum Laude Thesis: An Introduction to Algebraic Curves **Languages** English: Second Language Italian: Native fluency German: Beginner

Conferences and Seminars

October 2023	**19th Herbstseminar der Bioinformatik** Bioinformatics Group and Computational EvoDevo Group in Leipzig Guest Speaker "Orthology Pipeline: Project and Realization"
July 2023	**Hybrid: SIAM Conference on Applied Algebraic Geometry (AG23)** SIAM Activity Group on Algebraic Geometry Invited Minisymposium Speaker "How to 3D-reconstruct the genome from partially phased data"
June 2023	**10th Slovenian Conference on Graph Theory** Faculty of Mathematics and Physics of University of Lubiana Guest Speaker "Vertex colored digraphs explained by phylogenetic trees"
February 2023	**37th TBI Winterseminar in Bled** Bompfünewerer Consortium Guest Speaker "Quasi Best Match Graphs"
October 2022	**18th Herbstseminar der Bioinformatik** Bioinformatics Group and Computational EvoDevo Group in Leipzig Guest Speaker "How merging colors characterizes 3-BMGs"
August 2022	**European Women in Mathematics General Meeting 2022** European Women in Mathematics Invited Minisymposium Speaker "3 questions on higher-dimensional neuronal manifolds"
August 2022	**28th Nordic Congress of Mathematicians** Nordic Mathematical Associations Invited Minisymposium Speaker "Shape & Linearity of neuronal manifolds"
May 2022	**Combinatorics 2022** Italian Institute of Mathematics (IndaM) Guest Speaker "Best match graphs and generalizations"

January 2020	**Algebra and Discrete Mathematics Seminar** Department of Mathematics and Systems Analysis of Aalto University Guest Speaker "Colored Best Match Graphs"
May 2015	**Georgia Tech Combinatorics Seminars** Department of Mathematics of Georgia Institute of Technology Guest Speaker "Combinatorial Properties of Block Transpositions in Symmetric Groups"
June 2014	**Combinatorics 2014** Italian Institute of Mathematics (IndaM) Guest Speaker "Block transposition diameter of the symmetric group"
March 2014	**45th Southeastern International Conference on Combinatorics, Graph Theory and Computing (SEICCGTC)** National Security Agency and Institute of Combinatorics and its Applications Guest Speaker "On the block transposition diameter of permutations"

Posters, Publications and Preprints

1 **J. A. R. Rafael; A. Korchmaros; P. F. Stadler; M. H. Rosales**

Solving inconsistencies between gene trees and species trees for the reconstruction of whole-genome evolutionary scenarios
Poster presented at: XIII International Conference of the Iberoamerican Society of Bioinformatics; November 2023; Rosario, Argentina

2 **D. Cifuentes; J. Draisma, O. Henriksson; A. Korchmaros; K. Kubjas**

3D genome reconstruction from partially phased Hi-C data
arXiv doi:2301.11764, in press (2023)

3 **A. Korchmaros; D. Schaller; M. Hellmuth; P. F. Stadler**

Quasi-Best Match Graphs
Discrete Appl. Math. 331 (2023), 104-125

4 **A. Korchmaros**

The structure of 2-colored best match graphs. Discrete Appl. Math. 304 (2021), 397-416

5 **X. Wang; X. Li; J. Cho; B. Russ; N. Rajamani; A. Omelchenko; L. Ai; A. Korchmaros; P. Garcia-Saldivar;Z. Wang; N. Kalin; C. Schroeder; C. Craddock; A. Fox; A. Evans; A. Messinger; M. Milham; T. Xu**

U-Net Model for Brain Extraction on Non-human Primates
Neuroimage 226 (2021), 117549

6 **J. Cho; A. Korchmaros; J. Vogelstein; M. Milham; T. Xu**

Impact of concatenating fMRI data on reliability for functional connectomics
Neuroimage 235 (2021), 118001

7 **J. Cho; A. Korchmaros; J. Vogelstein; M. Milham; T. Xu**

Developing a gradient flow framework to guide the optimization of reliability for the study of individual differences
Poster presented at: Organization of Human Brain Mapping 2020; June 2020; Virtual Conference

8 **A. Korchmaros**

Circles and Paths in 2-Colored Best Match Graphs
arXiv doi:2006.04100 (2020)

9 **A. Korchmaros; J. Cho; A. Heinsfeld; J. Haxby; M. Milham; T. Xu**

Beyond the test-retest reliability: the impact of the intra- and inter-individual variation

Poster presented at: Organization of Human Brain Mapping 2019; June 2019; Rome, Italy

10 **A. Korchmaros; I. Kovacs**

Automorphism groups of Cayley graphs generated by block transpositions and regular Cayley maps

Discrete Math. 340 (2017), 3125–3139

11 **C. Bocci; A. Korchmaros**

Tropical properties of alignment matrices

Adv. Appl. Discrete Math. 11 (2013), no. 1, 23–46

Organization

October 2023 - present **G. Scholz**

Graph Theory Seminar

Bioinformatics Center in Leipzig

August 2021 **M. Panizzut; L. Lamberti**

Minisymposium on Algebraic Geometry of Biomedical Data

SIAM Conference on Applied Algebraic Geometry

Skills

Programming Languages

MATLAB, R, Python, Julia, and Shell scripting

Software

FSL, Git, Macualay2, Magma, and JMP