NIKOLA HRISTOV KONSTANTINOV

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EDUCATION AND EMPLOYMENT

04.2022 – 04.2023	**ETH Zurich AI Center: Postdoctoral fellow** - Mentors: Prof. Martin Vechev and Prof. Fanny Yang - Research focus: *Trustworthy Machine Learning*
2017 – 03.2022	**IST Austria (ISTA): PhD Student;** Member the **ELLIS PhD Program** - Supervisor: Prof. Christoph H. Lampert - Thesis: *Robustness and Fairness in Machine Learning*
2013 – 2017	**University of Oxford: Master in Mathematics and Statistics; Grade: 1.1** - Master Thesis: *"Kernel Dependence Measures for Unsupervised Learning"*, supervised by Prof. Dino Sejdinovic - Focus on Probability Theory, Stochastic Analysis, Statistics
2005 – 2013	**Sofia High School of Mathematics** - Bulgarian High School Diploma, grade 5.99 out of 6 - Extracurricular classes in Mathematics, Informatics and English

INTERNSHIPS AND ACADEMIC VISITS

Spring of 2021	**University of Milan, Italy: ELLIS PhD Exchange Visit (3 months)** - Host: Prof. Nicolò Cesa-Bianchi - Studying models for online learning from multiple unreliable data sources
Summer of 2019	**Amazon.com, Berlin, Germany: Applied Research Internship (3 months)** - Group: Intelligent Cloud Control; Mentor: Paul Vazquez - Evaluation and model comparison of predictive models for cloud computing
Summer of 2016	**ATASS Sports, Exeter, UK: Research Internship (7 weeks)** - Statistical modelling for sports prediction - Experience in statistical programming with R and manipulating large datasets
Summer of 2015	**IST Austria (ISTA): Research Internship (11 weeks)** - Supervisor: Prof. Nick Barton - Research in mathematical models of evolution

PAPERS

Publications

1. Florian E. Dorner, Momchil Peychev, **N.K.**, Naman Goel, Elliott Ash, Martin Vechev: Human-Guided Fair Classification for Natural Language Processing
   In: International Conference on Learning Representations **(ICLR)**, **Spotlight**
   Short version in: **TSRML@NeurIPS workshop**, 2022

2. Dimitar I. Dimitrov, Mislav Balunović, **N.K.**, Martin Vechev: *Data Leakage in Federated Averaging*
   In: Transactions of Machine Learning Research **(TMLR)**, 2022

3. Eugenia Iofinova[♯], **N. K.**[♯], Christoph H. Lampert: *FLEA: Provably Fair Multisource Learning from Unreliable Training Data*
   In: Transactions of Machine Learning Research **(TMLR)**, 2022; ♯ **Equal contribution**

4. **N. K.**, Christoph H. Lampert: *Fairness-Aware PAC Learning from Corrupted Data*
   In: Journal of Machine Learning Research **(JMLR)**, 2022

5. **N. K.**, Christoph H. Lampert: *On the Impossibility of Fairness-Aware Learning from Corrupted Data*
    In: **AFRC@NeurIPS workshop, Contributed talk**, 2021

6. **N. K.**, Elias Frantar, Dan Alistarh, Christoph H. Lampert: *On the Sample Complexity of Adversarial Multi-Source PAC Learning*
    In: *International Conference on Machine Learning* **(ICML)**, 2020

7. **N. K.**, Christoph H. Lampert: *Robust Learning from Untrusted Sources*
    In: *International Conference on Machine Learning* **(ICML), Long Talk,** 2019

8. Dan Alistarh, Torsten Hoefler, Mikael Johansson, **N. K.***, Sarit Khirirat, Cedric Renggli: *The Convergence of Sparsified Gradient Methods*
    In: *Conference on Neural Information Processing Systems* **(NeurIPS)**, 2018; *** Alphabetic order**

9. Dan Alistarh, Chris De Sa, **N. K.***: *The Convergence of Stochastic Gradient Descent in Asynchronous Shared Memory*
    In: *ACM Symposium of Principles of Distributed Computing* **(PODC)**, 2018; *** Alphabetic order**

Preprints

1. Florian E. Dorner, **N.K.**, Giorgi Pashaliev, Martin Vechev: Non-Cooperative Mean Estimation with Rational Agents in Federated Learning
    In preparation, 2023

2. Nikita Tsoy, **N.K.**: Collaboration between competitors: sharing data strategically in oligopolistic markets
    In preparation, 2023

3. N. K., Christoph H. Lampert: Fairness Through Regularization for Learning to Rank
    Arxiv: https://arxiv.org/abs/2102.05996

INVITED TALKS

1. April 2023: MLO group seminar; EPFL, Lausanne, Switzerland
    Title: *Mechanism Design for Federated Learning with Strategic Agents*

2. October 2022: TrustML Young Scientists Seminars (online)
    Title: *Statistical Aspects of Trustworthy Machine Learning*

3. October 2022: INSAIT Annual Conference, Tutorial Session; Sofia, Bulgaria
    Title: *Statistical Machine Learning: Foundations and Present Challenges*

4. July 2022: MLO group seminar; EPFL, Lausanne, Switzerland
    Title: *Statistical Aspects of Trustworthy Machine Learning*

5. February 2022: ETH AI Center Postdoctoral Symposium (online)
    Title: *Statistical Aspects of Trustworthy Machine Learning*

6. December 2021: Guest lecture at the ETH course on Trustworthy ML (online)
    Title: *Statistical Aspects of Group Fairness-Aware Learning*

7. May 2021: GILT seminar series, University of Milan
    Title: *On the Sample Complexity of Adversarial Multi-Source PAC Learning*

AWARDS AND SCHOLARSHIPS

Academic	- ETH AI Center Postdoctoral Fellowship, 2022 - *PODC student travel award*, SIGOPS, 2018 - *Davies Prize for MMath Part C*, Jesus College, Oxford, 2017 - *Department of Statistics Prize for MMath Part A*, Oxford, 2015 - *Open Scholarship*, Jesus College, Oxford – 3 awards (2014-2016) - *Bulgarian National Scholarship* for gifted students – 4 awards (2008 – 2011)
Olympiads	- 20th international "DUEL" competition 2012 (Czech Republic): *First place* - Princeton University Mathematical Competition 2011, Power Round (Team Project): *Third Place* - Junior Balkan Mathematical Olympiad 2008: Bronze medal

SKILLS

IT skills	**Experienced with:** Python, Tensorflow, NumPy, R, LaTeX, Ubuntu **Have worked with:** JAX, C++, Matlab, HTML, Mathematica
Languages	**Fluent:** English, Bulgarian; **Conversational:** German, Russian

MISCELLANEOUS

Reviewing	- NeurIPS (2021-), ICML (2021-), AISTATS (2022-), JMLR, TMLR
Teaching	**ETH Zurich: Teaching Assistant** - 09.2022 – 12.2022: Reliable and Trustworthy Artificial Intelligence (RTAI) **IST Austria (ISTA): Teaching Assistant** - 02.2020 – 04.2020: *Formal Methods for Learned Systems* - 11.2018 – 01.2019: *Deep Learning with Tensorflow* - 10.2018 – 11.2018: *Statistical Machine Learning*
Responsibilities	**IST Austria (ISTA): ML meetup organizer** - 2020 – 2021: Organizing a reading group for the ML students at ISTA **IST Austria (ISTA): Student representative in Data Science** - 2018 – 2020: Representing Data Science students at ISTA; providing feedback about related postgraduate courses; welcoming first-year Data Science students **Oxford University Bulgarian Society** - 2015 – 2016: *President* – organising weekly talks, film nights, joint meetings with other university societies; maintaining the society's website - 2014 – 2015: *Secretary* – communicating with members and applicants
Summer Schools	**Machine Learning Summer School (MLSS), Madrid 2018** - Two weeks of talks about various areas of machine learning, taught by world-leading experts in the respective fields
Hobbies	**Sports:** running, bouldering, squash, (table) tennis; **Others:** reading fiction