

# Nicholas Heller

## Curriculum Vitae

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## Research Interests

My interests are centered around making efficient use of domain experts' time in providing annotated data for medical image segmentation models. In particular, I'm interested in the tradeoff between label quantity and quality, and how certain label errors can be relatively benign to model performance, where others endow pernicious biases. I am also interested in meta-science and have a love for open datasets and machine learning competitions.

## Education

2017–Present **PhD Computer Science & Engineering**, *University of Minnesota – Twin Cities.*

**Advisor:** Nikolaos Papanikolopoulos

**GPA:** 3.94

2013–2017 **B.S. Computer Science**, *University of Minnesota – Twin Cities.*

## Selected Publications and Presentations

2022 *Computer-generated RENAL Nephrometry scores yield comparable predictive results to those of human-expert scores in predicting oncologic and perioperative outcomes.*

**Nicholas Heller**, Resha Tejpaul, ..., Nikolaos Papanikolopoulos, Christopher Weight  
The Journal of Urology

2021 *"The Algorithm Will See You Now": The Role of Artificial (and Real) Intelligence in the Future of Urology.*

**Nicholas Heller**, Christopher Weight  
European Urology Focus

2021 *The state of the art in kidney and kidney tumor segmentation in contrast-enhanced CT imaging: Results of the KiTS19 Challenge.*

**Nicholas Heller**, Fabian Isensee, ..., Christopher Weight, Nikolaos Papanikolopoulos  
Medical Image Analysis

2020 *Fully Automated, Computer Generated R.E.N.A.L. Nephrometry Scores Yield Comparable Predictive Results to that of Human-Expert Scores.*

**Nicholas Heller**, Keenan Moore, ..., Nikolaos Papanikolopoulos, Christopher Weight  
Under Review: The Journal of Urology

2020 *Coarse Texture in Contrast-Enhanced CT as a Predictor of Renal Tumor Subtype and Grade.*

**Nicholas Heller**, Makinna Oestreich, ..., Nikolaos Papanikolopoulos, Christopher Weight  
Oral Presentation: Annual Meeting of the American Urological Association

- 2020 *Temporal Variability of Surgical Technical Skill Perception in Real Robotic Surgery.*  
Jason Kelly, Michael Nash, **Nicholas Heller**, Thomas Lendvay, Timothy Kowalewski  
International Journal of Computer Assisted Radiology and Surgery
- 2019 *Public Perceptions of Artificial Intelligence and Robotics in Medicine.*  
Bethany Stai, **Nicholas Heller**, ..., Nikolaos Papanikolopoulos, Christopher Weight  
The Journal of Endourology
- 2019 *The Role of Publicly Available Data in MICCAI Papers from 2014 to 2018.*  
**Nicholas Heller**, Jack Rickman, Christopher Weight, and Nikolaos Papanikolopoulos  
Oral Presentation, MICCAI LABELS Workshop, 2019
- 2019 *The KiTS19 Challenge Data: 300 Kidney Tumor Cases with Clinical Context, CT Semantic Segmentations, and Surgical Outcomes.*  
**Nicholas Heller**, Niranjan Sathianathen, ..., Nikolaos Papanikolopoulos, Christopher Weight  
Under Review: Nature - Scientific Data
- 2019 *Class Saliency Maps Reveal Computer Vision's Basis for Diagnosing Metastatic Carcinoma in Lymph Nodes.*  
**Nicholas Heller**, Nikolaos Papanikolopoulos, Vassilios Morellas, and Alexander Truskinovsky  
Platform Presentation, Annual Meeting of the US and Canada Academy of Pathology
- 2018 *Imperfect Segmentation Labels: How Much Do They Matter?.*  
**Nicholas Heller**, Joshua Dean, and Nikolaos Papanikolopoulos  
Oral Presentation, MICCAI LABELS Workshop, 2018
- 2018 *Computer Aided Diagnosis of Skin Lesions from Morphological Features.*  
**Nicholas Heller**, Erika Bussmann, Aneri Shah, Joshua Dean, Nikolaos Papanikolopoulos  
Technical Report
- 2017 *A Web-Based Platform for Distributed Annotation of Computerized Tomography Scans.*  
**Nicholas Heller**, Panagiotis Stanitsas, Vassilios Morellas, Nikolaos Papanikolopoulos  
MICCAI LABELS Workshop, 2017

## Service

- Lead Organizer MICCAI Kidney Tumor Segmentation Challenge (KiTS19, KiTS21); MICCAI DALI Workshop (2021); MICCAI LABELS Workshop (2019, 2020); University of Minnesota "Medical Imaging With AI" (MIWAI) Journal Club.
- Reviewer Medical Image Analysis (2020 - present), IEEE Transactions on Medical Imaging (2020 - present); International Conference on Medical Image Computing and Computer Assisted Interventions – MICCAI (2019, 2020, 2021); British Journal of Urology International – BJUI (2019 - present); International Conference on Robotics and Automation – ICRA (2019); IEEE Transactions on Intelligent Transportation Systems – IEEE-TMI (2018 - present); MICCAI DALI Workshop (2021 - present); MICCAI LABELS Workshop (2018 - 2020); Annual Meeting of the Engineering and Urology Society (2018, 2019).

## Teaching

- Spring 2018 CSCI 2033, Elementary Computational Linear Algebra, *Head TA, Guest Lecturer.*
- Fall 2017 CSCI 5511, Artificial Intelligence 1, *Head TA, Guest Lecturer.*

## Graduate Coursework

Completed Biostatistics I, Special Advanced Topics in Robotics and Vision; Computer Vision; Architecture and Implementation of Database Management Systems; Error-correcting Codes, Finite Fields, and Algebraic Curves; Computational Aspects of Matrix Theory; Theory of Probability and Statistics; Introduction to Machine Learning; Analysis of Numerical Algorithms; Introduction to Research in Computer Science; Computer Science Colloquium.

## Awards

ARCS Foundation Scholar.

Best Poster Award in Kidney, Ureter, and Adrenal session at SIU 2019.

Best Poster Award in Kidney Imaging session at EAU 2019.

Best Paper Nomination at MICCAI LABELS 2018.

## References

**Nikolaos Papanikolopoulos, PhD**  
Distinguished McKnight Presidential  
Endowed Professor  
Computer Science and Engineering  
University of Minnesota – Twin Cities

**Christopher Weight, MD, MS**  
Professor, Director  
Urologic Oncology Institute  
Cleveland Clinic

**Marvin Marshak, PhD**  
Distinguished Professor  
Physics  
University of Minnesota – Twin Cities

**Victoria Interrante, PhD**  
Professor  
Computer Science and Engineering  
University of Minnesota – Twin Cities