MITCHELL JONES, PH.D.

Software engineer and computational geometer

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SUMMARY

A Ph.D. in theoretical computer science with extensive experience in developing efficient algorithms for problems in computational geometry and combinatorial optimization. Eager to use his theoretical knowledge and previous technical experience to solve a variety of algorithmic challenges in industry.

EDUCATION

Ph.D. in Computer Science

University of Illinois at Urbana-Champaign

Aug 2016 – July 2021

- Research interests: computational geometry, randomized & approximation algorithms, combinatorial optimization
- Advisor: Sariel Har-Peled
- Thesis: On the Search for Geometric Orders, Centers, and Separation

Bachelor of Computer Science and Technology (Advanced) (Honors Class I & university medal)

University of Sydney

Feb 2012 – Nov 2015

- Advisor: Julián Mestre
- Thesis: The Maximum Facility Location Problem

SKILLS

Primary skills

C++ | Python | Git

See this GitHub repository for examples of some algorithms and common data structures implemented in Java and C++.

Secondary skills

Rust | Java | CGAL (CG algorithms library) | LaTeX | SQL

Previously used

HTML/CSS | Javascript | PHP | C | C# | Objective-C

Previous experience with many other web technologies, including Django, MongoDB, Neo4j, jQuery, and Bootstrap.

EXPERIENCE

Senior software engineer

Localization & Mapping

Nuro

Aug 2021 – Present | Mountain View, CA, USA

- Implemented several geometric data structures, used for offline map feature generation
- Refactored key APIs for accessing map data and relevant geometric data structures onboard & offboard. Collaborated with autonomy teams across the company that accessed map data to improve their total memory usage onboard and end-to-end latency
- Co-developed core routing algorithm that supports lane changes, published theoretical, and experimental findings at WAFR'22 [JHB22]

Research and teaching assistant

University of Illinois at Urbana-Champaign

Aug 2016 – Jul 2021 | Champaign, IL, USA

- Worked with Sariel Har-Peled as a research assistant
- Developed randomized and approximation algorithms for various problems in computational geometry (see selected publications)
- Teaching assistant for graduate and undergraduate algorithms classes (included weekly labs, grading, and office hours)

Research and teaching assistant

University of Sydney

Jul 2013 – Jun 2016 | Sydney, Australia

- Worked with Julián Mestre as a research assistant
- Developed new algorithms for computing treewidth of a graph—led to a paper in Algorithmica [GGJ+19]

Software engineering intern

Google

2014, 2015 | Sydney, Australia

- Interned during the summer of 2014 and 2015 (specifically Nov 2014 – Feb 2015 and Nov 2015 – Feb 2016)
- In 2014, worked with the Google Chrome team and implemented hosted apps for Mac (C++/Objective-C)

OUTREACH

CS Grad Ambassador

2017 – 2020 Champaign, IL, USA

- Ambassador connects with incoming graduate students
- Meet on visit days to answer questions they have about the grad program or life at UIUC

Zero Robotics Mentor

2015 – 2016 Sydney, Australia

- Mentor for the Zero Robotics for two years when it was piloted in Australia
- Each mentor is assigned a team of students from a high school, where they compete in an international programming challenge

NCSS Challenge tutor

2012 – 2015 Sydney, Australia

- Yearly online Python programming competition for high school students
- Regularly helped students with the programming tasks via an online forum

NCSS Summer school tutor

2014 Sydney, Australia

- Programming tutor for a ten day summer school, which brings together students in grades 11 and 12
- Ran labs on teaching Python, HTML, CSS, JavaScript, and SQL
- In 2015, worked with the social & discovery team building internal tools for data analysis (Java/Javascript)

ACHIEVEMENTS & AWARDS

2019

- Mavis Future Faculty Fellow award (MF3)
- Ranked as excellent teacher by students for the largest undergraduate algorithms class at UIUC (CS374; list compiled by the University of Illinois Center for Innovation in Teaching & Learning)

2015

- The Allan Bromley Prize for best honours thesis

2013

- HEDLOC Undergraduate Prize for Algorithms

2013 – 2015 (awarded annually)

- University of Sydney Academic Merit Prize
- Dean's List of Excellence in Academic Performance
- University of Sydney, School of IT's High Honour Roll

SELECTED PUBLICATIONS

See full list of publications on Google Scholar.

Conference Proceedings

[JHB22] M. Jones, M. Haas-Heger, and J. van den Berg. *Lane-level route planning for autonomous vehicles*. *Workshop on Algorithmic Foundations of Robotics (WAFR)*, vol. 25. 312–327, 2022.

Journal Articles

[CHJ22] T. M. Chan, S. Har-Peled, and M. Jones. *Optimal algorithms for geometric centers and depth*. *SIAM Journal on Computing*, 51(3): 627–663, 2022.

[HJ21] S. Har-Peled and M. Jones. *Journey to the Center of the Point Set*. *ACM Transactions on Algorithms*, 17(1), 2021. Originally appeared in SoCG 2019.

[HJR21] S. Har-Peled, M. Jones, and S. Rahul. *Active-learning a convex body in low dimensions*. *Algorithmica*: 1–33, 2021. Originally appeared in ICALP 2020.

[CHJ20] T. M. Chan, S. Har-Peled, and M. Jones. *On locality-sensitive orderings and their applications*. *SIAM Journal on Computing*, 49(3): 583–600, 2020. Originally appeared in ITCS 2019.

[HJ20] S. Har-Peled and M. Jones. *On separating points by lines*. *Discrete & Computational Geometry*, 63(3): 705–730, 2020. Originally appeared in SODA 2018.

[GGJ+19] S. Gaspers, J. Gudmundsson, M. Jones, J. Mestre, and S. Rümmele. *Turbocharging treewidth heuristics*. *Algorithmica*, 81(2): 439–475, 2019. Originally appeared in IPEC 2016.