

Dakshita Khurana

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Research Interests: Cryptography, Theoretical Computer Science.

Employment

- 2019 – ... ◇ **University of Illinois Urbana-Champaign;**
Assistant Professor of Computer Science.
- 2018 – 19 ◇ **Microsoft Research, New England;**
Postdoctoral Researcher.

Education

- 2018 ◇ **Ph.D. in Computer Science** at the University of California, Los Angeles.
- 2014 ◇ **M.S. in Computer Science** at the University of California, Los Angeles.
- 2012 ◇ **B. Tech. in Electrical Engineering with a Minor in Computer Science**
at the Indian Institute of Technology (IIT) Delhi, India.

Selected Honors

- 2023 ◇ **NSF CAREER Award:** Cryptographic Proofs, Outside the Black-Box.
- 2022 ◇ **IIT Delhi Graduate of Last Decade (GOLD) Award.**
◇ **DARPA Forward Riser.**
◇ On the List of **Teachers Ranked as Excellent** for Fall 2022 at UIUC.
- 2021 ◇ **Visa Research Faculty Award.**
◇ Paper awarded **Long Plenary Talk** at Quantum Information Processing QIP'21.
◇ On the List of **Teachers Ranked as Excellent** for Spring 2021 at UIUC.
- 2020 ◇ On the List of **Forbes 30 under 30** in Science.
◇ **Google Research Fellow** at the Simons Institute, Berkeley.
- 2019 ◇ On the List of **Teachers Ranked as Excellent** for Fall 2019 at UIUC.
◇ Paper invited to the **SIAM J. Computing Special Issue** for STOC 2019.
- 2018 ◇ **UCLA CS Outstanding Graduating PhD Student Award.**
◇ **Dissertation Year Fellowship**, University of California Los Angeles.
◇ **Symantec Outstanding Graduate Student Research Award.**
- 2017 ◇ Paper invited to the **SIAM J. Computing Special Issue** for FOCS 2017.
◇ **CISCO Outstanding Graduate Student Research Award.**
- 2012 ◇ **Computer Science Department Fellowship**, University of California Los Angeles.

Publications

(Authors Alphabetical)

1. Bartusek, J., Garg, S., Khurana, D. & Roberts, B. (2023). Blind delegation with certified deletion. *Quantum Information Processing, QIP 2023 (merged with the work below)*.
2. Bartusek, J. & Khurana, D. (2023). Cryptography with certified deletion. *Quantum Information Processing, QIP, 2023 (merged with the work above)*.
3. Canetti, R., Chakraborty, S., Khurana, D., Kumar, N., Poburinnaya, O. & Prabhakaran, M. (2022). COA-secure obfuscation and applications. In *Advances in Cryptology, EUROCRYPT 2022*.
4. Hulett, J., Jawale, R., Khurana, D. & Srinivasan, A. (2022). SNARGs for P from sub-exponential DDH and QR. In *Advances in Cryptography, EUROCRYPT 2022*.
5. Ishai, Y., Khurana, D., Sahai, A. & Srinivasan, A. (2022a). Round optimal black-box protocol compilers. In *Advances in Cryptology, EUROCRYPT 2022*.
6. Ishai, Y., Khurana, D., Sahai, A. & Srinivasan, A. (2022b). Round-optimal black-box secure computation from two-round malicious ot. In *Theory of Cryptography Conference, TCC 2022*.
7. Badrinarayanan, S., Ishai, Y., Khurana, D., Sahai, A. & Wichs, D. (2022). Refuting the dream XOR lemma via ideal obfuscation and resettable MPC. In *the Information Theory Conference, ITC 2022*.
8. Jawale, R., Kalai, Y. T., Khurana, D. & Zhang, R. (2021). SNARGs and PPAD hardness from sub-exponential LWE. In *Symposium on the Theory of Computing, STOC 2021*.
9. Bartusek, J., Coladangelo, A., Khurana, D. & Ma, F. (2021b). One-way functions imply secure computation in a quantum world. In *Advances in Cryptology, CRYPTO 2021, Quantum Information Processing, QIP 2021, and QCrypt 2021*. **Long Plenary at Quantum Information Processing, QIP 2021. Invited Talk at QCrypt 2021.**
10. Bartusek, J., Coladangelo, A., Khurana, D. & Ma, F. (2021a). On the round complexity of two-party quantum computation. In *Advances in Cryptology CRYPTO 2021, Quantum Information Processing QIP 2021, and QCrypt 2021*.
11. Chatterjee, R., Garg, S., Hajiabadi, M., Khurana, D., Liang, X., Malavolta, G., Pandey, O. & Shiehian, S. (2021). Compact ring signatures from Learning with Errors. In *Advances in Cryptology, CRYPTO 2021*.
12. Ishai, Y., Khurana, D., Sahai, A. & Srinivasan, A. (2021). On the round complexity of black-box secure MPC. In *Advances in Cryptology, CRYPTO 2021*.
13. Khurana, D. & Srinivasan, A. (2021). Improved computational extractors and their applications. In *Advances in Cryptology, CRYPTO 2021*.
14. Agarwal, A., Bartusek, J., Goyal, V., Khurana, D. & Malavolta, G. (2021b). Two-round maliciously secure computation with super-polynomial simulation. In *Theory of Cryptography Conference, TCC 2021*.

15. Khurana, D. (2021). Non-interactive distributional indistinguishability (NIDI) and non-malleable commitments. *In Advances in Cryptography, EUROCRYPT 2021.*
16. Khurana, D. & Waters, B. (2021). On the CCA upgradeability of public-key infrastructure. *In international conference on practice and theory of public-key cryptography PKC 2021.*
17. Agarwal, A., Bartusek, J., Goyal, V., Khurana, D. & Malavolta, G. (2021a). Post-quantum multi-party computation. *In Advances in Cryptography, EUROCRYPT 2021.*
18. Garg, R., Lu, G., Khurana, D. & Waters, B. (2021). Black-box non-interactive non-malleable commitments. *In Advances in Cryptography, EUROCRYPT 2021.*
19. Badrinarayanan, S., Fernando, R., Jain, A., Khurana, D. & Sahai, A. (2020). Statistical zap arguments. *In Advances in Cryptology, EUROCRYPT 2020.*
20. Garg, A., Kalai, Y. & Khurana, D. (2020). Computational extractors with negligible error in the crs model. *In Advances in Cryptology, EUROCRYPT 2020.*
21. Khurana, D. & Mughees, M. H. (2020). On statistical security in two-party computation. *In Theory of Cryptography Conference, TCC 2020.*
22. Bitansky, N., Khurana, D. & Paneth, O. (2020). Weak zero-knowledge beyond the black-box barrier. *In Symposium on the Theory of Computing, STOC 2019. Published by invitation in the SIAM Journal on Computing (SICOMP), 2022, Special Issue for STOC 2019.*
23. Kalai, Y. T. & Khurana, D. (2018). Non-interactive non-malleability from quantum supremacy. *In Advances in Cryptology, CRYPTO 2019.*
24. Badrinarayanan, S., Goyal, V., Jain, A., Kalai, Y., Khurana, D. & Sahai, A. (2018). Promise zero-knowledge and its applications to round-optimal MPC. *In Advances in Cryptology, CRYPTO 2018.*
25. Badrinarayanan, S., Kalai, Y., Khurana, D., Sahai, A. & Wichs, D. (2018). Non-interactive delegation for low-space non-deterministic computation. *In Symposium on the Theory of Computing, STOC 2018.*
26. Kalai, Y., Khurana, D. & Sahai, A. (2018). Statistical WI (and more) in 2 messages. *In Advances in Cryptology, EUROCRYPT 2018.*
27. Badrinarayanan, S., Khurana, D., Sahai, A. & Waters, B. (2018). Upgrading to functional encryption. *In Theory of Cryptography Conference, TCC 2018.*
28. Khurana, D., Ostrovsky, R. & Srinivasan, A. (2018). Round optimal black-box “Commit-and-Prove”. *In Theory of Cryptography Conference, TCC 2018.*
29. Khurana, D. & Sahai, A. (2017). How to achieve non-malleability in one or two rounds. *In IEEE Foundations of Computer Science, FOCS 2017. Invited to SIAM Journal on Computing (SICOMP) Special Issue for FOCS 2017.*
30. Jain, A., Kalai, Y. T., Khurana, D. & Rothblum, R. (2017). Distinguisher- dependent simulation in two rounds and its applications. *In Advances in Cryptology, CRYPTO 2017.*

31. Badrinarayanan, S., Khurana, D., Ostrovsky, R. & Visconti, I. (2017). Unconditional UC-Secure Computation with (Stronger-Malicious) PUFs. In *Advances in Cryptology, EUROCRYPT 2017*.
32. Badrinarayanan, S., Goyal, V., Jain, A., Khurana, D. & Sahai, A. (2017). Round optimal concurrent MPC via strong simulation. In *Theory of Cryptography Conference, TCC 2017*.
33. Khurana, D. (2017). Round optimal concurrent non-malleability from polynomial hardness. In *Theory of Cryptography Conference, TCC 2017*.
34. Goyal, V., Khurana, D. & Sahai, A. (2016). Breaking the three round barrier for non-malleable commitments. In *IEEE Annual Symposium on Foundations of Computer Science, FOCS 2016*.
35. Khurana, D., Kraschewski, D., Maji, H. K., Prabhakaran, M. & Sahai, A. (2016). All complete functionalities are reversible. In *Advances in Cryptology, EUROCRYPT 2016*.
36. Khurana, D., Maji, H. K. & Sahai, A. (2016). Secure computation from elastic noisy channels. In *Advances in Cryptology, EUROCRYPT 2016*.
37. Goyal, V., Khurana, D., Mironov, I., Pandey, O. & Sahai, A. (2016). Do distributed differentially-private protocols require oblivious transfer? In *International Colloquium on Automata, Languages, and Programming, ICALP 2016*.
38. Hofheinz, D., Jager, T., Khurana, D., Sahai, A., Waters, B. & Zhandry, M. (2016). How to generate and use universal samplers. In *Advances in Cryptology, ASIACRYPT 2016*.
39. Agrawal, S., Ishai, Y., Khurana, D. & Paskin-Cherniavsky, A. (2015). Statistical randomized encodings: A complexity theoretic view. In *International Colloquium on Automata, Languages, and Programming, ICALP 2015*.
40. Khurana, D., Rao, V. & Sahai, A. (2015). Multi-party key exchange for unbounded parties from indistinguishability obfuscation. In *Advances in Cryptology, ASIACRYPT 2015*.
41. Khurana, D., Maji, H. K. & Sahai, A. (2014). Black-box separations for differentially private protocols. In *Advances in Cryptology, ASIACRYPT 2014*.

Invited Talks

1. Cryptography with Certified Deletion. **CMU Cylab Cryptography Seminar; Nov 2022.**
2. Quantum Cryptography from Minimal Assumptions. **Invited Tutorial at the UCLA IPAM Graduate Summer School on Post-quantum and Quantum Cryptography; July 2022.**
3. From Deletion to Secure Computation and Back. **Spotlight Talk at the Information Theoretic Cryptography Conference, Boston; July 2022.**
4. SNARGs and PPAD Hardness from Sub-exponential DDH and QR. **Boston Crypto Day; July 2022.**
5. Quantum Oblivious Transfer from One-way Functions. **Invited Talk at QCrypt; Aug 2021.**

6. On Removing Interaction in Non-Malleable Commitments. **MIT Cryptography and Information Security (CIS) Seminar**; *Apr 2021*.
7. Secure Federated Learning for Clinical Diagnostics with Applications to the COVID-19 Pandemic. **C3.AI DTI Virtual Symposium**; *Jan 2021*.
8. SNARGs and PPAD Hardness from Sub-exponential LWE. **TIFR School of Technology and Computer Science Colloquium**; *Dec 2020*.
9. Secure Federated Learning for Clinical Diagnostics. **Arches COVID Seminar**; *Nov 2020*.
10. Post-quantum Multi-party Computation. **Theory and Practice of Multiparty Computation Workshop (TPMPC) at Aarhus University**; *May 2020*.
11. New Techniques in Zero-Knowledge. **Trends in TCS Workshop, TTI Chicago**; *Jan 2020*.
12. Two-Message Statistically Private Arguments. **Simons Institute Workshop on Probabilistically Checkable and Interactive Proofs**; *Sep 2019*.
13. Weak Zero-Knowledge Beyond the Black-Box Barrier. **Carnegie Mellon University Theory talk**; *Jun 2019*.
14. Quantum Advantage and Classical Cryptography. **Charles River Crypto Day at Northeastern University**; *May 2019*.
15. New Techniques to Overcome Barriers in Simulation. **Indian Institute of Technology Mumbai, India**; *Dec 2018*.
16. Breaking Simulation Barriers. **University of Illinois Urbana-Champaign**; *Apr 2018*.
17. On Cryptographic Proof Systems. **Caltech CMS Theory Seminar**; *Dec 2017*.
18. New Techniques for Extraction. **South California Theory Day**; *Nov 2017*.
19. The Virtues of Two-Message OT. **Boston University Crypto Seminar**; *Sep 2017*.
20. Distinguisher-Dependent Simulation. **DIMACS Workshop on Outsourcing Computation Securely, Rutgers**; *Jul 2017*.
21. How to Achieve Non-Malleability in One or Two Rounds. **MIT Cryptography and Information Security (CIS) Seminar**; *Jun 2017*.
22. Birthday Simulation from Exponential Hardness, and its Applications. **New York Crypto Day at Cornell Tech**; *May 2017*.
23. Two-Message Non-Malleable Commitments. **UCSD Theory Seminar**; *Nov 2016*.
24. How to Generate and Use Universal Samplers. **Stanford DIMACS Workshop on Cryptography and Software Obfuscation**; *Nov 2016*.
25. Breaking the Three Round Barrier for Non-Malleable Commitments. **SIMONS Berkeley**

Cryptography Reunion Workshop; Aug 2016.

26. Breaking the Three Round Barrier for Non-Malleable Commitments. **DIMACS Workshop on Cryptography and its Interactions, Rutgers; Jul 2016.**
27. How to Obtain Two-Message Non-Malleable Commitments. **MIT Cryptography and Information Security (CIS) Seminar; Jun 2016.**
28. Constructing Two-Message Non-Malleable Commitments. **New York University Cryptography Reading Group; May 2016.**
29. New Constructions of Non-Malleable Commitments. **Cornell Tech Cryptography Seminar; May 2016.**
30. Multi-party Key Exchange for Unbounded Parties from Obfuscation. **Stanford Security Seminar; Feb 2016.**
31. How to Generate and Use Universal Samplers. **South California Theory Day, University of South California; Nov 2015.**
32. Multi-party Key Exchange for Unbounded Parties from Obfuscation. **SIMONS Berkeley Workshop on Securing Computation; Aug 2015.**

Teaching

- Fall 2022 ◇ Instructor, UIUC. Cryptography (Undergraduate) CS 407.
- Spring 2022 ◇ Instructor, UIUC. Quantum Cryptography (Graduate) CS 598CTO.
- Fall 2021 ◇ Instructor, UIUC. Algorithms and Models of Computation (Undergraduate) CS 374.
- Spring 2021 ◇ Instructor, UIUC. Special Topics in Cryptography (Graduate) CS 598 DK.
Listed among Teachers Ranked as Excellent by Their Students.
- Fall 2020 ◇ Instructor, UIUC. Applied Cryptography (Undergraduate) CS/ECE 498 AC (407).
- Fall 2019 ◇ Instructor, UIUC. Special Topics in Cryptography (Graduate) CS 598 DK.
Listed among Teachers Ranked as Excellent by Their Students.

Students Advised

- PhD ◇ Ruta Jawale, 2019-Present.
 - ◇ Amit Agarwal, 2019-Present.
 - ◇ James Hulett, 2020-Present.
 - ◇ Kabir Tomer, 2022-Present.
- MS ◇ Andrew Liu, 2020-21. *Secure and Scalable Robust Federated Learning.*
 - ◇ Nishant Kumar, 2020-22. *New Frameworks for Quantum Oblivious Transfer.*

Current and Prior Research Support

- 2023-26 ◇ **NSF SaTC Small:** “New Cryptographic Capabilities for a Quantum World”
PI: D.K. *USD 571,719.*
- 2023-28 ◇ **NSF CAREER:** “Cryptographic Proofs, Outside the Black-Box”
PI: D.K. *USD 538,923.*
- 2021-23 ◇ **Visa Research Faculty Award**
PI: D.K. *USD 150,000.*
- 2021-24 ◇ **NSF MPS/Physics,** “Pushing the Boundaries of Classical and Quantum Information Processing Toward Enhanced Security and Energy-Efficient Reliability”.
PI: E. Chitambar, co-PIs: L. Varshney, D.K. *USD 599,912.*
- 2020-24 ◇ **DARPA “SIEVE: New Directions in Post-Quantum Zero-Knowledge”.**
PI: Amit Sahai, co-PI: D.K. *UIUC subaward: USD 423,422.*
- 2019-21 ◇ **C3AI DTI, Jump Arches,** “Secure Federated Learning for Clinical Informatics”.
PI: O. Koyejo, co-PIs: W. Bond, D.K. *USD 100,000.*
- 2019-20 ◇ **Jump ARCHES,** “Secure Federated Learning for Clinical Diagnostics”.
PI: O. Koyejo, co-PIs: W. Bond, D.K. *USD 60,000.*

Service

- Workshops ◇ Co-organizer of the STOC’22 workshop: “The Multiple Facets of Quantum Proofs”
◇ PC co-chair of the Asiacrypt’22 Satellite workshop on Quantum Cryptography
- PC Member ◇ STOC 2024
◇ ITCS 2023
◇ STOC 2022
◇ TCC 2022
◇ ACM India Doctoral Dissertation Award Committee 2022
◇ STOC 2020
◇ TCC 2020
◇ ITCS 2020
◇ Indocrypt 2020
◇ Eurocrypt 2019
- UIUC Engg ◇ **IQUIST (Illinois Quantum Information Science & Technology) Center.**
Science Advisory Board (SAB) Member, 2021-Present
◇ **IDEA (Inclusion, Diversity, Equity and Access) Institute.** Affiliate, 2020-Present
- UIUC CS ◇ Broadening Participation in Computing Committee Member, 2021-22, 2022-23
◇ Tenure-Track Recruiting Committee Member, 2020-21, 2021-22
◇ Graduate Study Committee Member, 2019-20, 2020-21, 2022-23
◇ Rising Stars Workshop Mentor, 2019-20, 2020-21