

Alex Strasser

Texas A&M University

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in Alex-M-Strasser
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Education

- (2027) **Ph.D. Materials Science and Engineering**, Texas A&M, College Station, TX.
December 2022 **M.S. Materials Science and Engineering**, Texas A&M, College Station, TX.
GPA: 3.75 | D³EM Fellow | Professional Development Certificate
Thesis: Optical Response and Stability of MA₂Z₄ and Pentagonal 2D Materials
- May 2020 **B.S. Chemical Engineering**, Texas A&M, College Station, TX.
GPA: 3.74 | Minors: Physics, Materials Science and Engineering
Thesis: Microscopic Origin of Nonlinear Optical Properties of 2D Materials
Thesis: Novel Nanomaterial Ink Coating Method for Functional 3D-Printed Parts

Relevant Coursework

- Philosophy Engineering and Ethics, Symbolic Logic II (Audit), Seminar in Ethics and Value Theory (Audit), Philosophy of Natural Science (Audit)
- Physics Quantum Theory of Solids, Solid State Physics, Quantum Mechanics I and II, Modern Physics, Methods of Theoretical Physics I, Electricity and Optics, Mechanics

Conference Presentations (Philosophy)

1. **A. Strasser**. Rutgers University, God and Fine-Tuning Summer School. "Fine-Tuning Confirms Finite Theism Over Omni-Theism." July 2023.
2. **A. Strasser**. Effective Altruism for Christians, Philosophical Foundations of Effective Altruism Workshop. "Effective Altruism, Consequentialism, and God's Glory." September 2022.
3. **A. Strasser**. Society of Christian Philosophers, 2022 Eastern Regional Meeting. "The *Imago Dei* and The Problem of Theistic Intrinsic Value." January 2022.
4. **A. Strasser**. Society of Christian Philosophers, 2021 Midwest Regional Meeting. "Maximizing God's Glory: A Normative Ethical Theory." October 2021. (Virtual)

Ongoing Projects (Philosophy)

1. Divine Glory Consequentialism: A Normative Ethical Theory
 - Defends a theistic ethical theory where an action is right iff it results in maximal divine glory
2. The Strong Emergence of Quasiparticles in Condensed Matter Physics
 - Outlines a taxonomy of quasiparticles (e.g., phonons, excitons, holes) and defends their existence and strong emergence
3. Varieties of Non-Omni Theism and A Defense of Finite Theism
 - Distinguishes between two kinds of non-omni theism, demonstrates their independent metatheological motivations, and attempts to advance the case for finite theism
4. Skeptical Theism, Moral Skepticism, and Epistemically Inaccessible Goods
 - Uses epistemic constraints in ethics to block moral skepticism and then motivates an epistemic

- asymmetry of moral goods and God's motivations for permitting evil
5. Parsimony is Bad News for Eternalism (or Eternalism is Bad News for Parsimony)
 - Shows how the case from quantitative and qualitative parsimony against eternalism has been vastly underestimated, but instead shifts the argument against parsimony as a theoretical virtue
 6. An Argument from the Value of Persons for God's Existence
 - Suggests that the existence of a divine being in our causal history is the best solution to the tension between the value of persons and a valueless empty cosmos
 7. Christians Can (and Should) be Consequentialists
 - Responds to previous arguments that consequentialism is incompatible with theism and motivates a version of Christian consequentialism
 8. A Tripartite Taxonomy of Material Possessions in Light of God's Glory
 - Introduces three kinds of material possessions (needs, tools for good, and luxuries) and argues that luxuries should be eliminated and needs and tools for good should be optimized
 9. Theistic Axiology and the Problem of Theistic Intrinsic Value
 - Responds to previous arguments that theism is incompatible with creaturely intrinsic value and develops a theistic theory of value based on the *Imago Dei* that allows creaturely intrinsic value
 10. Existential Inertia in Support of a B-Theoretic Kalām Cosmological Argument
 - Explicates a counterpart to existential inertia for non-existent objects and shows how this supports the causal principle in the kalām, defending a B-theoretic version of the kalām

Publications (Science)

1. H. Yu, M. Liu, Y. Luo, **A. Strasser**, X. Qian, X. Qian, and S. Ji. "QH9: A Quantum Hamiltonian Prediction Benchmark for QM9 Molecules." Accepted at The 37th Conference on Neural Information Processing Systems (NeurIPS). arXiv 2306.09549 (2023).
2. **A. Strasser**, H. Wang, X. Qian. "Nonlinear Optical and Photocurrent Responses in Janus MoSSe Monolayer and MoS₂-MoSSe van der Waals Heterostructure." *Nano Letters*. 2022.
3. A. A. Puretzky, Y.-C. Lin, C. Liu, **A. Strasser**, Y. Yu, S. Canulescu, C. M. Rouleau, K. Xiao, G. Duscher, D. B. Geohegan. "In situ laser reflectivity to monitor and control the nucleation and growth of atomically-thin 2D materials." *2D Materials*. 2020.
4. Y.-C. Lin, C. Liu, Y. Yu, Y. Gu, E. Zarkadoula, M. Yoon, A. A. Puretzky, L. Liang, **A. Strasser**, X. Kong, H. M. Meer, M. Lorenz, M. F. Chisholm, I. Ivanov, C. M. Rouleau, G. Duscher, K. Xiao, D. B. Geohegan. "Low energy implantation into transition metal dichalcogenide monolayers to form Janus structures." *ACS Nano*. 2020.
5. W. Strasser, **A. Strasser**. "Challenging Paradigms By Optimizing Combustible Dust Separator." *ASME Journal of Fluids Engineering*. 2018.
6. C. B. Sweeney, A. Moran, J. Gruener, **A. Strasser**, M. J. Pospisil, M. A. Saed, M. J. Green. "Radio Frequency Heating of Carbon Nanotube Composite Materials." *Journal of Advanced Materials*. 2018.
7. W. Strasser, **A. Strasser**. "Investigation of Dust Separator Design and Risk Mitigation." ASME Fluids Engineering Division Summer Meeting. FEDSM2017-69097. 2017.

Pre-publication Manuscripts (Science)

1. J. Tang, S. T. Ding, H. Chen, A. Gao, T. Qian, Z. Huang, Z. Sun, X. Han, **A. Strasser**, J. Li, M. Geiwitz, M. Shehabeldin, V. Belosevich, Z. Wang, Y. Wang, K. Watanabe, T. Taniguchi, D. C. Bell, Z. Wang, L. Fu, Y. Zhang, X. Qian, K. S. Burch, Y. Shi, N. Ni, G. Chang, S.-Y. Xu, and Q. Ma. "Observation of the dual quantum spin Hall insulator by density-tuned correlations in a van der Waals monolayer." Submitted to *Nature*. 2023

2. X. Zhang, L. Wang, J. Helwig, Y. Luo, C. Fu, Y. Xie, M. Liu, Y. Lin, Z. Xu, K. Yan, K. Adams, M. Weiler, X. Li, T. Fu, Y. Wang, H. Yu, Y. Xie, X. Fu, **A. Strasser**, S. Xu, Y. Liu, Y. Du, A. Saxton, H. Ling, H. Lawrence, H. Stärk, S. Gui, C. Edwards, N. Gao, A. Ladera, T. Wu, E. F. Hofgard, A. Mansouri Tehrani, R. Wang, A. Daigavane, M. Bohde, J. Kurtin, Q. Huang, T. Phung, M. Xu, C. K. Joshi, S. V. Mathis, K. Azizzadenesheli, A. Fang, A. Aspuru-Guzik, E. Bekkers, M. Bronstein, M. Zitnik, A. Anandkumar, S. Ermon, P. Liò, R. Yu, S. Günnemann, J. Leskovec, H. Ji, J. Sun, R. Barzilay, T. Jaakkola, C. W. Coley, X. Qian, X. Qian, T. Smidt, and S. Ji. "Artificial Intelligence for Science in Quantum, Atomistic, and Continuum Systems." arXiv: 2307.08423. 2023.
3. **A. Strasser**, X. Qian. "Electronic Structure and Optical Properties of MA_2Z_4 Synthetic 2D Crystals." (In Preparation)

Conference Presentations (Science)

1. **A. Strasser**, X. Qian. MRS Fall Meeting. "First-Principles Study of Electronic Structure and Nonlinear Optical Responses of Novel Two-Dimensional Materials and Moiré Superlattices." 2023. (Poster).
2. **A. Strasser**, H. Wang, X. Qian. APS March Meeting. "Nonlinear Optical Properties of Janus 2D Materials: A First Principles Study." 2020. (Oral).
3. **A. Strasser**, H. Wang, X. Qian. Gulf Coast Undergraduate Research Symposium, Rice University. "First-Principles Study of Nonlinear Optical Properties of Janus MoSSe." 2019. (Oral).
4. **A. Strasser**, C. Rouleau, A. D. Oyedele, K. Xiao, D. Geohegan. Texas A&M University, Grand Challenge Research Program Symposium. "Probing Photocurrent Response in 2D Materials Using Scanning Photocurrent Microscopy." 2019. (Poster).
5. (**Invited**) **A. Strasser**, A. Moran, C. B. Sweeney, M. J. Green. Materials Technology Institute, AmeriTAC 127. "Nanomaterial Ink Coating for Functional 3D-printed Parts." 2018. (Oral).
6. **A. Strasser**, A. Moran, C. B. Sweeney, M. J. Green. Texas A&M University, Student Research Week. "Nanomaterial Ink Coating for Functional 3D-printed Parts." 2018. (Oral).
7. **A. Strasser**, C. Rouleau, A. D. Oyedele, K. Xiao, D. Geohegan. Bulletin of the American Physical Society, 85th Annual Meeting of the APS Southeastern Section. "Probing Photocurrent Response in 2D Materials Using Scanning Photocurrent Microscopy." (Poster).
8. **A. Strasser**, C. Rouleau, A. D. Oyedele, K. Xiao, D. Geohegan. Oak Ridge National Laboratory, CNMS User Meeting. "Development of a Scanning Photocurrent Microscope for Nanomaterial Characterization." 2018. (Poster).
9. **A. Strasser**, A. Moran, C. B. Sweeney, M. J. Green. American Materials Society International, Thermal Processing in Motion. "Nanomaterial Ink Coating for Functional 3D-printed Parts." 2018. (Oral).
10. **A. Strasser**, W. Strasser. American Society of Mechanical Engineers. Fluids Engineering Division Summer Meeting. 19th Symposium on Industrial and Environmental Applications of Fluid Mechanics. "Preliminary Air-Water Bottle Rocket Design." 2012. (Oral).

Awards

- Outstanding Engineering M.S. Graduate Student Award 2022
- Outstanding Scholarly Output (UT-Battelle) 2020
- Data-Enabled Discovery and Design of Energy Materials Fellowship 2020-2021
- BP Scholar 2018
- Dean's Excellence Award Honorable Mention 2017

- 3rd Place Aggies Invent 2017
- NAE Grand Challenge Scholar 2016-2020
- President's Endowed Scholar 2015-2020
- University Honors, Engineering Honors 2015-2020
- Brown Scholar (full ride merit scholarship) 2015-2020
- Eagle Scout 2015

Research Experience (Science)

Research Internships

- May–Aug. 2020 **Condensed Matter Physics Intern**, *Lawrence Berkeley National Laboratory*, Berkeley, CA.
- Extended the Wannier Koopman Method for predicting band gap to heterostructures
- May–Dec. 2018 **Materials Science Intern**, *Oak Ridge National Laboratory*, Oak Ridge, TN.
- Developed new monitoring technique for synthesis of 2D materials
 - Computational studies on laser-material interactions to support monitoring system
 - Synthesized a novel 2D material
- Jan.–Aug. 2017 **Materials Science Intern**, *Oak Ridge National Laboratory*, Oak Ridge, TN.
- Assembled and coded a scanning photocurrent microscope (SPCM) worth \$300,000
 - Synthesized 2D materials and measured their optoelectronic properties

Research Experience

- 2019–Present **Dr. Xiaofeng Qian's Materials Theory Group**, *Materials Science & Engineering, Texas A&M University*, College Station, TX.
- Predicted strong nonlinear photocurrent response in Janus 2D materials
 - Investigated electronic and phononic band structure, finding significant Rashba- and Zeeman-type spin splitting and dynamic stability
 - Performed group theoretical analyses on 2D materials to qualitatively assess the symmetry of their optical response
- 2016–2018 **Dr. Micah Green's Dispersed Nanomaterials Group**, *Chemical Engineering, Texas A&M University*, College Station, TX.
- Demonstrated novel ink 3D-printing method
 - Designed experiments for cross-linking an unstable polymer

Research Skills

- Languages** Spanish (limited working proficiency), Arabic (beginner)
- Computational** Python, C#, Linux, Bash, Density Functional Theory, MATLAB, LabVIEW, Vim, VESTA, ASPEN, AutoLISP, LayoutEditor, Natural Language Processing, L^AT_EX
- Experimental** Scanning Photocurrent Microscopy (SPCM), Chemical Vapor Deposition (CVD), Pulsed Laser Deposition (PLD), photolithography, electron beam evaporation, instrumentation, Scanning Electron Microscopy (SEM), Raman Spectroscopy, (low temperature) semiconductor characterization, additive manufacturing, rheometry

Professional Organizations

- American Philosophical Association (APA) 2021 - Present
- Islamicate Digital Humanities Network (IDHN) 2021 - Present
- Materials Research Society (MRS) 2020 - Present
- American Physical Society (APS) 2017 - Present

Service

- Associate Editor of *Theophron: Journal of Christian Studies* 2021 - Present
- Effective Altruism for Christians, Campus Representative 2021 - Present
- Tau Beta Pi (Engineering Honors Society), Conference Co-Chair 2017 - 2019
- American Institute of Chemical Engineers, Mentor 2016 - 2019
- Christian Engineering Leaders, Mentor 2015 - 2020

Conference Attendance (Philosophy)

1. Rutgers University: God and Fine-Tuning Summer School. 2023.
 2. Canadian Society of Christian Philosophers (CSCP): 2022 Annual Meeting
 3. Society of Christian Philosophers (SCP): 2021 Midwest Meeting, 2022 Eastern Regional Meeting
 4. American Philosophical Association (APA): 2021 Eastern, Central, Pacific Division Meetings
 5. Princeton Philosophy of Religion Project (3PR): Incubator 2021, 2022 and Axiology of Theism 2021
 6. Helsinki Analytic Theology Workshop (HEAT) 2022
 7. Effective Altruism for Christians (EACH): 2021, 2022 Annual Conference; 2021 Workshop on Religious Perspectives on Effective Altruism; 2022 Mini-Workshop
 8. Islamicate Digital Humanities Network (IDHN): 2021, 2022 Digital Hadith Studies Online Conference
- Note: all virtual except SCP 2022 in West Palm Beach, Florida