

# Kyle Godbey

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Google Scholar

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## Education

- 2015–2020 **PhD in Physics**, *Vanderbilt University*, Nashville, TN.  
2015–2017 **MA in Physics**, *Vanderbilt University*, Nashville, TN.  
2011–2015 **BA in Physics, Minor in Computer Science**, *Berea College*, Berea, KY, Cum Laude.

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## Research Experience

- 2021–Current **Facility for Rare Isotope Beams**, *Theoretical Nuclear Dynamics*.  
Postdoctoral research associate investigating nuclear dynamics with a focus on microscopic descriptions of fission processes. Continued effort towards developing and maintaining state of the art nuclear simulation software. Advised by Prof. Witek Nazarewicz.
- 2020–2021 **Texas A&M**, *Theoretical Nuclear Dynamics*.  
Postdoctoral research associate in the CENTAUR Center for excellence investigating basic nuclear physics and related processes. Duties include developing performant simulation software and running at scale on leadership class computers. Advised by Prof. Jeremy Holt.
- 2015–2020 **Vanderbilt University**, *Theoretical Nuclear Dynamics*.  
Using time-dependent density functional theory (TDDFT) and its extensions to study low-energy nuclear reactions. Substantial effort devoted to maintaining and extending modern TDDFT software. Advised by Prof. Sait Umar.
- May 2018, **Visiting Researcher**, *Australian National University*, Canberra, Australia.  
March 2019, Invited guest of Prof. Cedric Simenel at the Australian National University primarily investigating  
Feb. 2020 low-energy nuclear reactions using TDDFT.
- Fall 2014 **Frankfurt Institute for Advanced Studies**, *Theoretical Study of Nuclear Decay Modes in Neutron Rich Super Heavy Elements*.  
Theoretical study into characteristics and properties of extremely neutron rich elements under the supervision of Prof. Walter Greiner.

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## Teaching Experience

- Fall 2018 **Practice and Pedagogy Leader**, *Vanderbilt University Center for Teaching*, Nashville, TN.  
Position co-leading the pedagogical component of incoming teaching assistant orientation for physics.
- 2015–2017 **Physics Teaching Assistant**, *Vanderbilt University*, Nashville, TN.  
Position teaching undergraduate lab courses in the physics department at Vanderbilt.
- Fall 2017 **Teaching Affiliate**, *Vanderbilt University Center for Teaching*, Nashville, TN.  
Position leading the orientation of a group of incoming teaching assistants and organizing follow-up sessions to ease the transition into a teaching role at the university.
- 2013–2015 **Physics Teaching Assistant**, *Berea College Physics Department*, Berea, KY.  
Position working with students to help with their studies in physics, as well as continuing the research duties mentioned above.

- 2013–2015 **Computer Science Teaching Assistant**, *Berea College Computer Science Department*, Berea, KY.  
Position tutoring students and assisting development of a new introductory programming course.

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## Grants

- 2020-2021 FY **Texas A&M High Performance Research Computing Research Grant**.  
605000 service unit research grant to study systematic uncertainties in low-energy nuclear fusion reactions.

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## Talks Given

- 2021 **APS Division of Nuclear Physics**, *Virtual*.  
2021 **APS April Meeting**, *Virtual*.  
2020 **Los Alamos National Lab T2 Seminar**, *Virtual*.  
2020 **APS Division of Nuclear Physics**, *Virtual*.  
2020 **Texas A&M Cyclotron Seminar**, *Texas A&M*.  
2014 **National Conference on Undergraduate Research**, *University of Kentucky*.  
2013 **99th Annual Meeting of the Kentucky Academy of Sciences**, *Morehead State University*.

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## Workshops/Hackathons/Summer Schools

- 2021 **QHack Quantum Machine Learning Hackathon**, *Online*.  
2020 **IBM Quantum Challenge**, *Online*.  
2020 **1<sup>st</sup> Lindau Sciathon**, *Online*.  
2019 **69<sup>th</sup> Lindau Nobel Laureate Meeting**, *Lindau, Germany*.  
2019 **Machine Learning Applied to Nuclear Physics FRIB-Theory Alliance Summer School**, *Michigan State University*.  
2018 **Frontiers in Nuclear and Hadronic Physics Nuclear Reactions Workshop**, *Galileo Galilei Institute*.  
2016 **Density Functional Theory TALENT School**, *University of York*.  
2014 **GSI Summer Student Program**, *GSI*.

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## Awards

- 2021-2022 **Cloud Computing Fellow**, *MSU Institute for Cyber-Enabled Research*.  
Fellowship program exploring cloud computing technologies for research applications. [More info here](#).  
2018 **Most Outstanding Student Publication Award**, *Vanderbilt University*.  
Awarded yearly to “recognize the most outstanding student publication for a paper published during the previous calendar year”  
2017 **A.V. Ramayya Award**, *Vanderbilt University*.  
Awarded yearly to “the most outstanding physics or astronomy graduate student Teaching Assistant”  
2016 **Robert T. Lagemann Award**, *Vanderbilt University*.  
Awarded yearly to an “entering or first-year graduate student for exceptional promise in physics”  
2014 **Global Education Opportunity (GEO) Scholarship**, *Berea College*.

2013 **Physics Presentation Award**, *Kentucky Academy of Sciences*.

## Computer skills

Programming Languages Fortran, Python, C, C++, CUDA

Paradigms High performance computing, Parallel computing, Machine learning

System Experience MSU HPCC; TAMU HPRC - Terra, Ada; Australian NCI - Raijin, Gadi; OLCF - Summit

## Society memberships

American Physical Society

The Internet Society

## Journal Articles

- [1] E. Flynn, D. Lay, S. Agbemava, P. Giuliani, K. Godbey, W. Nazarewicz, and J. Sadhukhan, "Nudged elastic band approach to nuclear fission pathways (in preparation)",
- [2] K. Godbey, A. S. Umar, and C. Simenel, "Uncertainty quantification in microscopic heavy-ion fusion reactions (in preparation)", (2021).
- [3] L. Li, L. Guo, K. Godbey, and A. S. Umar, "Tensor force influence of quantum shell effects in quasifission reactions (submitted)", (2021).
- [4] C. Simenel, P. McGlynn, A. S. Umar, and K. Godbey, "Comparison of fission and quasi-fission modes", *Physics Letters B* **822**, 136648 (2021).
- [5] A. S. Umar, C. Simenel, and K. Godbey, "Pauli energy contribution to the nucleus-nucleus interaction (Editors' Suggestion)", *Phys. Rev. C* **104**, 034619 (2021).
- [6] A. Bulgac, I. Abdurrahman, K. Godbey, and I. Stetcu, "Fragment intrinsic spins and fragments' relative orbital angular momentum in nuclear fission (accepted in *Phys. Rev. Lett.*)", (2021).
- [7] K. Godbey, Z. Zhang, J. W. Holt, and C. M. Ko, "Charged pion production from Au + Au collisions at  $\sqrt{s_{NN}} = 2.4$  GeV in the Relativistic Vlasov-Uehling-Uhlenbeck model (submitted)", (2021).
- [8] A. Bulgac, I. Abdurrahman, S. Jin, K. Godbey, N. Schunck, and I. Stetcu, "Fission fragment intrinsic spins and their correlations", *Phys. Rev. Lett.* **126**, 142502 (2021).
- [9] C. Simenel, K. Godbey, and A. S. Umar, "Timescales of quantum equilibration, dissipation and fluctuation in nuclear collisions", *Phys. Rev. Lett.* **124**, 212504 (2020).
- [10] K. Godbey, C. Simenel, and A. S. Umar, "Microscopic predictions for the production of neutron-rich nuclei in the reaction  $^{176}\text{Yb} + ^{176}\text{Yb}$ ", *Phys. Rev. C* **101**, 034602 (2020).
- [11] K. Godbey and A. S. Umar, "Quasifission dynamics in microscopic theories", *Frontiers in Physics* **8**, 40 (2020).
- [12] K. Godbey, L. Guo, and A. S. Umar, "Influence of the tensor interaction on heavy-ion fusion cross sections", *Phys. Rev. C* **100**, 054612 (2019).
- [13] K. Godbey, C. Simenel, and A. S. Umar, "Absence of hindrance in a microscopic  $^{12}\text{C} + ^{12}\text{C}$  fusion study", *Phys. Rev. C* **100**, 024619 (2019).

- [14] K. Godbey, A. S. Umar, and C. Simenel, “Deformed shell effects in  $^{48}\text{Ca} + ^{249}\text{Bk}$  quasifission fragments”, Phys. Rev. C **100**, 024610 (2019).
- [15] L. Guo, K. Godbey, and A. S. Umar, “Influence of the tensor force on the microscopic heavy-ion interaction potential”, Phys. Rev. C **98**, 064607 (2018).
- [16] C. Simenel, A. S. Umar, K. Godbey, M. Dasgupta, and D. J. Hinde, “How the Pauli exclusion principle affects fusion of atomic nuclei”, Phys. Rev. C **95**, 031601 (Rapid Communication) (2017).
- [17] K. Godbey, A. S. Umar, and C. Simenel, “Dependence of fusion on isospin dynamics”, Phys. Rev. C **95**, 011601 (Rapid Communication) (2017).
- [18] V. Tarasov, K. Gridnev, S. Schramm, V. Kuprikov, D. Gridnev, D. Tarasov, K. Godbey, X. Viñas, and W. Greiner, “Light exotic nuclei with extreme neutron excess and  $2 \leq Z \leq 8$ ”, International Journal of Modern Physics E **24**, 1550057 (2015).

## Conference Proceedings

- [1] A. S. Umar, C. Simenel, S. Ayik, and K. Godbey, “Equilibration dynamics in nuclear reactions”, in 4th International Conference on Nuclear Structure and Dynamics (NSD2019) Venice, Italy, May 13-17, 2019, Vol. 223 (2019), p. 01066.
- [2] A. S. Umar, C. Simenel, and K. Godbey, “Equilibration dynamics and isospin effects in nuclear reactions”, in IL NUOVO CIMENTO, Vol. C41, 5 (2019), p. 173.
- [3] C. Simenel, K. Godbey, A. S. Umar, K. Vo-Phuoc, M. Dasgupta, D. J. Hinde, and E. C. Simpson, “Effect of Pauli repulsion and transfer on fusion”, in 7th International Conference on Heavy-Ion Collisions at Near-Barrier Energies (FUSION17) Hobart, Tasmania, February 20-24, 2017 (2017).
- [4] C. Simenel, M. Dasgupta, D. J. Hinde, K. Godbey, and A. S. Umar, “Microscopic Approach To Heavy-ion Fusion: role of the Pauli principle”, in Proceedings of The 26th International Nuclear Physics Conference (INPC2016). 11-16 September, 2016. Adelaide, Australia. id.212 (2016), p. 212.
- [5] V. Tarasov, K. Gridnev, W. Greiner, V. Kuprikov, D. Gridnev, D. Tarasov, X. Viñas, and K. Godbey, “Investigating the properties of nuclei with extreme neutron excess and  $2 \leq Z \leq 8$ ”, in , Vol. 79, 7 (2015), pp. 819–822.

## Popular Science

- [1] K. Godbey, *Physics ex Machina*, (2019) <https://www.lindau-nobel.org/physics-ex-machina/>.