

Department of Astronomy
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EMPLOYMENT

- 2022 – **NASA Hubble Fellow**
 Center for Astrophysics | Harvard & Smithsonian
- 2021 - 22 **Cottrell Fellow**
 Department of Astronomy, University of Texas at Austin
- 2018 - 21 **Harlan J. Smith Postdoctoral Fellow**
 McDonald Observatory, University of Texas at Austin

EDUCATION

- 2018 **PhD in Physics**, California Institute of Technology.
 Thesis: *On the Origin of Scales and Scaling Laws in Star Formation*.
 Advisor: Prof. Philip F. Hopkins.
- 2013 **M. S. in Physics**, Budapest University of Technology.
 Thesis: *Statistical Analysis of Density Fluctuations in Toroidal Plasmas*.
 Advisor: Dr. Attila Bencze.
- 2011 **B. S. in Physics**, Budapest University of Technology.
 Thesis: *Simulation of Beam Emission Spectroscopy Diagnostics*.
 Advisor: Dr. Gergő Pokol.

RESEARCH INTERESTS

Theoretical astrophysics, primarily the rich phenomena of star formation and their broader implications. Using both analytical and numerical tools to answer questions like: What regulates star formation? What sets the characteristic mass of stars? Why are stars clustered? How is star formation different in other galaxies?

PUBLICATIONS

Refereed: **16 first author papers**, 7 co-authored papers (see attached publication list).
 Metrics: >500 citations, **h-index: 17**

RECENT & UPCOMING TALKS

Invited talks

- 2022 Aug *SFDE 2020*, Quy Nhon, Vietnam
- 2020 July *IMF 2020*, Durham, UK (cancelled)
- 2020 June *STAR@LYON*, Lyon, France (cancelled)

Contributed talks

- 2022 June *From Stars To Galaxies II*, Chalmers University, Sweden
- 2021 Oct Ringberg Virtual Seminar
- 2021 Jan *237th Meeting of the American Astronomical Society*
- 2020 Sept RSAA seminar, Australian National University
- 2020 July *Early Phase of Star Formation 2020*, Ringberg, Germany (postponed)

COMPUTING TIME ALLOCATIONS

66 million CPU hours, \$700,000 est. value	Project PI, <i>Star Formation in Giants: Simulating the Life of a GMC</i> , XSEDE, 2019-22.
22 million CPU hours, \$200,000 est. value	Project co-PI, <i>STARFORGE: Simulating star formation...</i> , TACC Frontera LRAC, 2021.
14 million CPU hours, \$130,000 est. value	Project co-PI, <i>Exploring the Physical Ingredients of Star Formation</i> , TACC Frontera Pathways, 2020.
6 million CPU hours \$34,000 est. value	Project co-PI, <i>Origin of the IMF</i> TACC, 2018-21.

FELLOWSHIPS

2022 –	<i>NASA Hubble Fellowship</i> , at Harvard & Smithsonian (\$350,000 est. value).
2021 - 22	<i>Cottrell Fellowship</i> from RCSA, at UT Austin (\$75,000 est. value).
2018 - 21	<i>Harlan J. Smith Postdoctoral Prize Fellowship</i> , at UT Austin (\$275,000 est. value).
2017	<i>Sai Wai and Beatrice Fu Graduate Fellowship</i> , at Caltech (\$60,000 est. value).

ADVISING

2019 –	<i>Enrico Piperno</i> , undergraduate research during the summer and academic terms. Results published in AAS research note, further results in first author paper in prep.
2020 - 21	<i>Aman Raju</i> , undergraduate research during the summer and academic terms. Results published in AAS research note, further results in second author paper in prep.
2021	<i>Amanda Lue</i> , undergraduate summer research (TAURUS program). Results published in AAS research note
2020	<i>Carleen Markey</i> , undergraduate summer research (NSF REU program). Results published a peer-reviewed paper in MNRAS

TEACHING**University of Texas at Austin**

2020-21	<i>Introduction to Astronomy (AST 301)</i> . Undergraduate course. Co-lecturer (2 semesters, 12 lectures + office hours).
2019	Lecturer in the <i>Computational Astrophysics Spring School</i>

California Institute of Technology

2014–18	<i>Waves, Quantum and Statistical Mechanics (Ph2)</i> . Undergraduate course. Recitation TA with office hours & quiz review sessions (8 terms).
2013–14	<i>Classical Mechanics & Electrodynamics (Ph1)</i> . Undergraduate course Recitation TA with office hours & quiz review sessions (4 terms) .

PROFESSIONAL SERVICE & OUTREACH

2020	Academic career seminar organizer for undergraduate researchers at UT Austin
2019	Science Organizing Committee member for the 2019 Frank N. Bash Symposium
2018	Public talks (e.g., Austin Astronomy on Tap)
2016 –	Referee on 11 papers in MNRAS, ApJ and A&A
2011–13	Public talks at high schools about various physics topics (e.g. quantum mechanics)
2011	Founding member of Eugene Wigner College (scientific student organization) at Budapest University of Technology

Mentored students are underlined in the author lists.

First Author Peer-Reviewed Publications

1. **Guszejnov D.**, Grudić M. Y., Offner S. R., and Faucher-Gigère C., Hopkins P. F. and Rosen A. L., (2022), *Effects of the environment and feedback physics on the initial mass function of stars in the STARFORGE simulations*, accepted by MNRAS
2. **Guszejnov D.**, Markey C., Offner S. R., Grudić M. Y., Faucher-Gigère C., Rosen A. L. and Hopkins P. F., (2022), *Cluster assembly and the origin of mass segregation in the STARFORGE simulations*, MNRAS, 515, 167-184
3. **Guszejnov D.**, Grudić M. Y., Hopkins P. F., Offner S. R., and Faucher-Gigère C. (2021), *STARFORGE: The effects of protostellar outflows on the IMF*, MNRAS, 502, 3646-3663
4. **Guszejnov D.**, Grudić M. Y., Hopkins P. F., Offner S. R., and Faucher-Gigère C. (2020), *Can magnetized turbulence set the mass scale of stars?*, MNRAS, 496, 5072-5088
5. **Guszejnov D.**, Grudić M. Y., Offner S. R., Boylan-Kolchin M., Faucher-Gigère C., Wetzel A., Benincasa S. M. and Loebman S. (2019), *Evolution of giant molecular clouds across cosmic time*, MNRAS, 492, 488-502
6. **Guszejnov D.**, Hopkins P. F. and Graus A. S. (2019), *Is it possible to reconcile extragalactic IMF variations with a universal Milky Way IMF?*, MNRAS, 485, 4852-4862
7. **Guszejnov D.**, Hopkins P. F., Grudić M. Y., Krumholz, M. and Federrath, C. (2018), *Isothermal Fragmentation: Is there a low mass cut-off?*, MNRAS, 468, 4093-4106.
8. **Guszejnov D.**, Hopkins P. F., and Grudić M. Y. (2017), *Universal Scaling Relations in Scale-Free Structure Formation*, MNRAS, 477, 5139-5149.
9. **Guszejnov D.**, Hopkins P. F., and Ma X. (2017), *Comparing Models for IMF Variation Across Cosmological Time in Milky Way-like Galaxies*, MNRAS, 472, 2107-2116.
10. **Guszejnov D.**, Hopkins P. F., and Krumholz M. R. (2017), *Protostellar feedback in turbulent fragmentation: consequences for stellar clustering and multiplicity*, MNRAS, 468, 4093-4106.
11. **Guszejnov D.**, Krumholz M. R., and Hopkins P. F. (2016), *The Necessity of Feedback Physics in Setting the Peak of the Initial Mass Function*, MNRAS, 458, 673-680.
12. **Guszejnov D.**, and Hopkins P. F. (2016), *Star formation in a turbulent framework: from giant molecular clouds to protostars*, MNRAS, 459, 9-20.
13. **Guszejnov D.**, and Hopkins P. F. (2015), *Mapping the core mass function to the initial mass function*, MNRAS, 450, 4137-4149.
14. **Guszejnov D.**, Lazányi N., Bencze A., and Zoletnik S. (2013), *On the effect of intermittency of turbulence on the parabolic relation between skewness and kurtosis in magnetized plasmas*, Physics of Plasmas, 20, 112305.
15. **Guszejnov D.**, Bencze A., Zoletnik S. and (2013), *Determination of Structure Tilting in Magnetized Plasmas - Time Delay Estimation in Two Dimensions*, Physics of Plasmas, 20, 062303.

16. **Guszejnov D.**, Pokol G. I., Pusztai I., Réfy D., Zoletnik S., Lampert M., and Nam Y. U. (2012), *Three-dimensional modeling of beam emission spectroscopy measurements in fusion plasmas*, Review of Scientific Instruments, 83, 113501.

Co-Authored Peer-Reviewed Publications

1. Grudić M. Y., **Guszejnov D.**, Offner S. R., Rosen A. L., Raju A. N., Faucher-Gigère C. and Hopkins P. F. (2022), *The dynamics and outcome of star formation with jets, radiation, winds, and supernovae in concert*, MNRAS, 512, 216-232
2. Lane H. B., Grudić M. Y., **Guszejnov D.**, Offner S. R., Faucher-Gigère C. and Rosen A. L. (2022), *Less wrong: a more realistic initial condition for simulations of turbulent molecular clouds*, MNRAS, 510, 4767-4778
3. Grudić M. Y., **Guszejnov D.**, Offner S. R., Hopkins P. F., and Faucher-Gigère C. (2021), *The STARFORGE: Toward a comprehensive numerical model of star cluster formation and feedback*, MNRAS, 506, 2199-2231
4. Benincasa S. M., Loebman S., Wetzel A., Hopkins P. F., Murray N., Bellardini M. A., Faucher-Gigère C., **Guszejnov D.**, and Orr M. (2019), *Live fast, die young: GMC lifetimes in the FIRE cosmological simulations of Milky Way mass galaxies*, MNRAS, 497, 3993-3999
5. Grudić M. Y., **Guszejnov D.**, Hopkins P. F., Lamberts A., Boylan-Kolchin M., Murray N., and Schmitz D. (2017), *From the Top Down and Back Up Again: Star Cluster Structure from Hierarchical Star Formation*, MNRAS, 481, 688-702.
6. Lampert M., Anda G., Czopf A., Erdei G., **Guszejnov D.**, Kovácsik Á., Pokol G. I., Réfy D., Nam Y. U. and Zoletnik S. (2016), *Combined hydrogen and lithium beam emission spectroscopy observation system for Korea Superconducting Tokamak Advanced Research*, Review of Scientific Instruments, 86, 073501.
7. Landreman M., Fülöp T., and **Guszejnov D.** (2011), *Impurity flows and plateau-regime poloidal density variation in a tokamak pedestal*, Physics of Plasmas, 18, 092507.

Non-Peer-Reviewed Publications

1. Lue A., **Guszejnov D.**, Offner S. R. and Grudić M. Y. (2021), *Evolution of the gas density in a simulated star-forming cloud with stellar feedback*, Research Notes of the AAS, 5, 225
2. Raju A. N., **Guszejnov D.**, Offner S. R. (2021), *Stellar Multiplicity in an RMHD Simulation with Stellar Feedback*, Research Notes of the AAS, 5, 164
3. Markey C., **Guszejnov D.** and Offner S. R. (2020), *Origins of Mass Segregation in Stellar Clusters within the STARFORGE Simulations*, Research Notes of the AAS, 4, 163
4. Piperno E., **Guszejnov D.**, Offner S. R. and Grudić M. Y. (2020), *Comparing Methods to Identify GMCs in Simulated Galaxies*, Research Notes of the AAS, 4, 14