

DAVID GUINOVART | CURRICULUM VITAE



- » **Position:** Assistant Professor, The Hormel Institute, University of Minnesota
- » **Laboratory:** Applied Mathematical, Computational, and Statistical Modeling
- » **eRA:** DGUINOVART
- » **Address:** **801 16th Ave NE, Austin, MN 55912**

»»» Experience

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| 2023 / 06 | Assistant Professor | The Hormel Institute |
| <ul style="list-style-type: none">» Lead the laboratory of Applied Mathematical, Computational, and Statistical Modeling» Development of mathematical methods applied in biology and material science | | |
| 2022-2023 | Assistant Professor | University of Delaware |
| <ul style="list-style-type: none">» Instructor of undergraduate courses of mathematics» Research in epidemiology, material science and fluid mechanics | | |
| 2021 - 2022 | Postdoctoral Research Scholar | University of Central Florida |
| <ul style="list-style-type: none">» Modeling of Smart Materials for Applications (Ram Mohapatra)» Flexoelectricity and piezoelectricity theory of composite materials | | |
| 2016-2021 | Graduate Teaching Assistant | University of Central Florida |
| <ul style="list-style-type: none">» Instructor of introductory mathematics courses» Research in mathematical modeling, solid mechanics and dynamical systems | | |
| 2013 - 2016 | Teaching / Researcher Assistant | Universidad de La Habana |
| <ul style="list-style-type: none">» Instructor of introductory mathematics courses» Research in elasticity theory and numerical methods for solid mechanics | | |

»»» Education

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|---|-------------------------------------|-------------------------------|
| 2017 - 2021 | Ph.D. in Applied Mathematics | University of Central Florida |
| <ul style="list-style-type: none">» Dissertation: <i>Computation of effective properties of smart composite materials with generalized periodicity using the two-scales asymptotic homogenization method</i>» Modeling flexoelectric composite materials using asymptotic techniques | | |
| 2016 - 2017 | M.S. in Applied Mathematics | University of Central Florida |
| <ul style="list-style-type: none">» Research in material science, mechanics of solid and fluid mechanics» Research in epidemiological and biology problems using dynamical systems and differential equations | | |
| 2013 - 2015 | M.S. in Mathematics | Universidad de La Habana |
| <ul style="list-style-type: none">» Research in numerical analysis, differential equations, and dynamical systems» Development of advanced numerical methods in MATLAB and R | | |
| 2009-2013 | B.S. in Mathematics | Universidad de La Habana |
| <ul style="list-style-type: none">» Learning teaching assistant for introductory mathematics courses» Research in differential equations and numerical analysis | | |

Publications and conference proceedings

- » **Guinovart-Sanjuán, D.**, Mohapatra, R., Rodríguez-Ramos, R., Espinosa-Almeyda, Y., & Rodríguez-Bermúdez, P. (2023). Influence of nonlocal elasticity tensor and flexoelectricity in a rod: An asymptotic homogenization approach. *International Journal of Engineering Science*, 193(103960), 103960. [10.1016/j.ijengsci.2023.103960](https://doi.org/10.1016/j.ijengsci.2023.103960)
- » Espinosa-Almeyda, Y., **Guinovart-Sanjuán, D.**, Rodríguez-Ramos, R., Camacho-Montes, H., & Rodríguez-Bermúdez, P. (2023). Effective properties of multi-laminated micropolar composites with Fibonacci and random structures. *Mathematics and Mechanics of Solids: MMS*. [10.1177/10812865231191733](https://doi.org/10.1177/10812865231191733)
- » Upadhyaya, S. M., Raju, C. S. K., Vajravelu, K., & **Guinovart-Sanjuán, D.** (2023). Analysis of micro-hybrid and Casson-hybrid nano-convective and radiative fluid flow in an inclined channel. *Journal of Nanofluids*, 12(1), 104–114. [10.1166/jon.2023.1916](https://doi.org/10.1166/jon.2023.1916)
- » Vaidya, H., Prasad, K. V., Vajravelu, K., Rajashekhar, C., Viharika, J. U., & **Guinovart-Sanjuan, D.** (2023). Bioconvective peristaltic transport of a nano Eyring-Powell fluid in a vertical asymmetric channel with gyrotactic microorganism. *Journal of Nanofluids*, 12(1), 115–135. [10.1166/jon.2023.1917](https://doi.org/10.1166/jon.2023.1917)
- » **Guinovart-Sanjuan, D.**, Rodríguez-Ramos, R., Vajravelu, K., Mohapatra, R., Guinovart-Díaz, R., Brito-Santana, H., Tita, V., & Sabina, F. J. (2022). Prediction of effective properties for multilayered laminated composite with delamination: A multiscale methodology proposal. *Composite Structures*, 297(115910), 115910. [10.1016/j.compstruct.2022.115910](https://doi.org/10.1016/j.compstruct.2022.115910)
- » **Guinovart-Sanjuán, D.**, Guinovart-Díaz, R., Vajravelu, K., Morales-Lezca, W., & Abelló-Ugalde, I. (2021). Multi-population analysis of the Cuban SARS-CoV-2 epidemic transmission before and during the vaccination process. *Physics of Fluids (Woodbury, N.Y.: 1994)*, 33(10), 107107. [10.1063/5.0066912](https://doi.org/10.1063/5.0066912)
- » **Guinovart-Sanjuán, D.**, Vajravelu, K., Rodríguez-Ramos, R., Guinovart-Díaz, R., Sabina, F. J., & Merodio, J. (2021). Simple closed-form expressions for the effective properties of multilaminated flexoelectric composites. *Journal of Engineering Mathematics*, 127(1). [10.1007/s10665-021-10096-5](https://doi.org/10.1007/s10665-021-10096-5)
- » **Guinovart-Sanjuan, D.**, Rodríguez-Ramos, R., Vajravelu, K., Guinovart-Díaz, R., Brito-Santana, H., & Tita, V. (2021). Study of effective properties in multilayered composites with different fracture modes at the interface. *Proceedings of BCCM 5*. [Proceedings of BCCM 5 repository](#)
- » **Guinovart Sanjuan, D.** (2021) Computation of Effective Properties of Smart Composite Materials with Generalized Periodicity Using the Two-Scales Asymptotic Homogenization Method. *Electronic Theses and Dissertations*, 2020-. 688. URL: ucf.edu/etd2020/688
- » Guinovart Díaz, R., Abelló Ugalde, I., Morales Lezca, W., Bravo Castellero, J., Rodríguez Ramos, R., & **Guinovart Sanjuán, D.** (2020). Modelo SIR para el seguimiento de la COVID-19 en Cuba. *Ciencias Matemáticas*, Vol. 34, No. 1, Pag. 1-12. URL: revinfodir.sld.cu/index.php/infodir/article/view/1030
- » Sabina, F. J., Guinovart-Díaz, R., Espinosa-Almeyda, Y., Rodríguez-Ramos, R., Bravo-Castillero, J., López-Realpozo, J. C., **Guinovart-Sanjuan, D.**, Böhlke, T., & Sánchez-Dehesa, J. (2020). Effective transport properties for periodic multiphase fiber-reinforced composites with complex constituents and parallelogram unit cells. *International Journal of Solids and Structures*, 204–205, 96–113. [10.1016/j.ijsolstr.2020.08.001](https://doi.org/10.1016/j.ijsolstr.2020.08.001)
- » **Guinovart-Sanjuán, D.**, Vajravelu, K., Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Lebon, F., Sabina, F. J., & Merodio, J. (2020). Effective predictions of heterogeneous flexoelectric multilayered composite with generalized periodicity. In *International Journal of Mechanical Sciences* (Vol. 181, p. 105755). Elsevier BV. [10.1016/j.jimecsci.2020.105755](https://doi.org/10.1016/j.jimecsci.2020.105755)
- » Rodríguez-Ramos, R., Ramírez-Torres, A., Bravo-Castillero, J., Guinovart-Díaz, R., **Guinovart-Sanjuán, D.**, Cruz-González, O. L., Sabina, F. J., Merodio, J., & Penta, R. (2019). Multiscale Homogenization for Linear Mechanics. In *Constitutive Modelling of Solid Continua* (pp. 357–389). Springer International Publishing. [10.1007/978-3-030-31547-4_12](https://doi.org/10.1007/978-3-030-31547-4_12)
- » Cruz-González, O. L., **Guinovart-Sanjuán, D.**, Rodríguez-Ramos, R., Bravo-Castillero, J., Guinovart-Díaz, R., Merodio, J., Penta, R., Otero, J. A., Dumont, S., Lebon, F., & Sabina, F. J. (2019). An approach for modeling non-ageing linear viscoelastic composites with general periodicity. In *Composite Structures* (Vol. 223, p. 110927). Elsevier BV. [10.1016/j.compstruct.2019.110927](https://doi.org/10.1016/j.compstruct.2019.110927)
- » **Guinovart-Sanjuán, D.**, Merodio, J., López-Realpozo, J., Vajravelu, K., Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., & Sabina, F. (2019). Asymptotic Homogenization Applied to Flexoelectric Rods. In *Materials* (Vol. 12, Issue 2, p. 232). MDPI AG. [10.3390/ma120202327](https://doi.org/10.3390/ma120202327)
- » **Guinovart-Sanjuán, D.**, Vajravelu, K., Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Lebon, F., & Sabina, F. J. (2018). Analysis of effective elastic properties for shell with complex geometrical shapes. In *Composite Structures* (Vol. 203, pp. 278–285). Elsevier BV. [10.1016/j.compstruct.2018.07.036](https://doi.org/10.1016/j.compstruct.2018.07.036)

- **Guinovart-Sanjuán, D.**, Rizzoni, R., Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Alfonso Rodríguez, R., Lebon, F., Dumont, S., Sevostianov, I., & Sabina, F. J. (2017). Behavior of laminated shell composite with imperfect contact between the layers. In *Composite Structures* (Vol. 176, pp. 539–546). Elsevier BV. [10.1016/j.compstruct.2017.05.058](https://doi.org/10.1016/j.compstruct.2017.05.058)
- **Guinovart-Sanjuán, D.**, Rizzoni, R., Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Alfonso Rodríguez, R., Lebon, F., Dumont, S., & Sabina, F. J. (2016). Assessment of models and methods for pressurized spherical composites. In *Mathematics and Mechanics of Solids* (Vol. 23, Issue 2, pp. 136–147). SAGE Publications. [10.1177/1081286516673233](https://doi.org/10.1177/1081286516673233)
- **Guinovart-Sanjuán, D.**, Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Sabina, F. J., Merodio, J., Lebon, F., Dumont, S., & Conci, A. (2016). Effective properties of regular elastic laminated shell composite. In *Composites Part B: Engineering* (Vol. 87, pp. 12–20). Elsevier BV. [10.1016/j.compositesb.2015.09.051](https://doi.org/10.1016/j.compositesb.2015.09.051)
- **Guinovart-Sanjuán, D.**, Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J. & Alfonso Rodríguez, R. (2016). Solución del problema elástico lineal en medios cilíndricos y esféricos transversalmente isotrópicos. *Revista Ciencias Matemáticas*, 1, 12-20. PRINTED
- **Guinovart-Sanjuán, D.**, Rodríguez-Ramos, R., Guinovart-Díaz, R., Bravo-Castillero, J., Conci, A. Lebon, F., & Dumont, S. (2015) Average of the elastic properties of bio-heterogeneous structures (Average of the elastic properties of the cornea). 23rd ABCM International Congress of Mechanical Engineering - COBEM2015, Dec 2015, Rio de Janeiro, Brazil. pp.CD ROM. [COBEM2015 repository: hal-01247923](https://hal.archives-ouvertes.fr/hal-01247923)
- Alfonso Rodríguez, R., Bravo Castillero, J., Brenner, R., **Guinovart-Sanjuán, D.**, Guinovart-Díaz, R. & Rodríguez, R. (2014). Computation of effective properties in two-phase piezocomposites with a rectangular periodic array. *Visión electrónica*, ISSN-e 2248-4728, ISSN 1909-9746, Vol. 8, No. 1, 2014, págs. 29-39 [codigo=8083010](https://doi.org/10.1016/j.vision.2014.01.001)

➤➤➤ Conference, Seminars and Colloquium

- 2023. Mathematical model on endemic permanence of COVID-19. The Hormel Institute Symposium, Austin, MN, US.
- 2023. Micromechanical characterization of quasi-periodic multi-laminated Cosserat elastic composites, Smart Composite Materials and Their Technological Applications Symposium at the 31st International Materials Research Congress, Cancun, Mexico
- 2022 Undergraduate Research Seminar, University of Central Florida, Orlando, FL, US. (Organizer)
- 2021. Analysis of the effective properties for multilayered piezocomposite with non-uniform imperfect contact at the interface. 46th Annual New York State Regional Graduate Mathematics Conference, Syracuse University, Syracuse, NY, US.
- 2021. Study of the effective properties of multilaminated composites. TROY MathFest 2021, Troy University, Troy, AL, US.
- 2021. A multipopulational analysis of Covid-19 transmission in Cuba and Puerto Rico. Student Scholar Symposium, University of Central Florida, Orlando, FL, US.
- 2021. Study of effective properties in multilayered composites with different fracture modes at the interface. 5th Brazilian Conference on Composite Materials, Sao Carlos, Brazil.
- 2020. Computation of effective properties of smart composite materials 2nd SIAM Knights Conference at UCF, University of Central Florida, Orlando, FL, US. (Organizer)
- 2020. Effective transport properties for periodic multiphase fiber-reinforced composites with complex constituents and parallelogram unit cells. 13th International Conference on Surfaces, Materials and Vacuum, Sociedad Mexicana de Ciencia y Tecnología de Superficies y Materiales A. C., CDMX, Mexico.
- 2020. Piezoelectric and Flexoelectric Composites. Applications to biomaterials. Encuentro Internacional: Alcances de la Ingeniería Biomédica, Merida, Yucatan, Mexico.
- 2020. Modelacion de compuestos laminados con fracturas en las interfaces. Seminario Internacional de Modelación Matemática, del Instituto de Investigaciones en Matemáticas Aplicadas y Sistemas, de la Universidad Nacional Autónoma de México, CDMX, Mexico.
- 2020. Modelos tipo SIR para la modelacion de epidemias con multiples poblaciones. Seminario Internacional de Modelación Matemática, del Instituto de Investigaciones en Matemáticas Aplicadas y Sistemas, de la Universidad Nacional Autónoma de México, CDMX, Mexico.
- 2019. Computation of effective properties of smart composites. Karlsruhe Institute of Technology, Karlsruhe, Germany, December 3, 2019.

- › 2019. Study of composite structures asymptotic homogenization method PDE seminar, Baylor University, Waco, Texas, US.
- › 2019. Effective predictions of three dimensional heterogeneous flexoelectric shells with complex geometrical shapes Graduate Student and Postdoc Poster Session, Field of Dreams Conference, Washington University, St. Louis, November 15-17, 2019.
- › 2019. Asymptotic homogenization of quasi-periodic viscoelastic heterogeneous structures. MECSOL 2019, 7th International Symposium on Solid Mechanics.
- › 2016. Study of bio-composites under inside pressure. European-Latin-American Conference of Theoretical and Applied Mechanics, ELACTAM, 2016, La Habana, Cuba. (Organizer)
- › 2015. Average of the elastic properties of bio-heterogeneous structures. 23rd ABCM International Congress of Mechanical Engineering, COBEM, 2015, Rio de Janeiro, Brazil.
- › 2015. Effective elastic properties of laminates shell composites and soft tissues. 18th International Workshop on Wavelets, Differential Equations and Analysis, 2015, La Habana, Cuba.

››› Awards, Grants & Scholarships

- › 2021 TROY MathFest 2021 scholarship. April. Troy University
- › 2021 Student Scholar Symposium winner scholarship. April. University of Central Florida
- › 2021 Graduate Student Travel Grant, American Mathematical Society. Joint Mathematics Meetings, 2021.
- › 2020 AIM Summer School on Dynamics, Data and the COVID 19 Pandemic, American Institute of Mathematics, San Jose, California.
- › 2020 Student Travel Grant, University of Central Florida. Field of Dreams Conference, Washington University, St. Louis.
- › 2019 Student Travel Grant, Department of Mathematics, University of Central Florida. American Mathematical Society. Joint Mathematics Meetings, Denver, CO, US, 2021.
- › 2019 College of Sciences General Scholarship. September. University of Central Florida
- › 2019 Yvette Kanouff Industrial Mathematics Scholarship. September. University of Central Florida
- › 2018 Award Dr. Ed Norman Award For Excellence In Math. April. Department of Mathematics, University of Central Florida
- › 2016 Award of the Facultad de Matemática y Computación to the Distinguished Investigation Group, Universidad de La Habana
- › 2015-2017 Project SHICHAN (Cooperation Scientifique Franco-Cubaine) PROJET N 29935XH, Universidad de la Habana/Aix-Marseille Université.
- › 2015-2017 CONACYT project number 129658, Universidad de La Habana/Universidad Autonoma de Mexico.
- › 2015-2017 Project Composite Materials from Universidad de La Habana

››› Research Stays and other experience

- › 2020 Universidad Autonoma de Mexico, CDMX, Mexico, July, 2020. *Mathematical models for the study of flexoelectric materials.*
- › 2020 Universidad de La Habana, La Habana, Cuba, August, 2020. *SIR models to predict the behavior of the COVID-19 pandemic in Cuba.*
- › 2017 Mathematics advisor. WileyPLUS, Knewton, University of Central Florida.
- › 2016-2017 Tutor at the Mathematics Assistance and Learning Lab, University of Central Florida.
- › 2015 Aix-Marseille Université, Marseille, France, (Cooperation Scientifique Franco-Cubaine), June, 2015. *Study of the spherical composite materials with internal pressure.*
- › 2013-2014 Mathematics advisor. Departamento de Criptografía, Universidad de La Habana.

»»» Teaching Experience

» University of Delaware

Course

MATH 241: Analytic Geometry and Calculus A
MATH353: Engineering Mathematics III
MATH351: Engineering Mathematics I

Term

Spring 2023, Fall 2022
Spring 2023
Winter 2023

» University of Central Florida

Course

MAC 1105: College Algebra
MAC 1114: College Trigonometry
MAC 1140: Pre-Calculus Algebra
MAC 2233: Concepts of Calculus
MAC 2311: Calculus with Analytic Geometry I
MAC 2312: Calculus with Analytic Geometry II
MAC 4113: Probability, Random Processes and Applications
MAP 2302: Ordinary Differential Equations
MAS 3105: Matrix and Linear Algebra

Term

Fall 2017
Fall 2021
Spring 2018
Spring 2020
Fall 2020, Fall 2018
Summer 2021, Spring 2020, Fall 2019
Fall 2021
Summer 2019, Summer 2018
Spring 2022, Fall 2021, Summer 2021,
Spring 2021, Summer 2020, Spring 2019

» Universidad de La Habana

Course

Introduction to the Topology
Mechanics of Solid Structures
Ordinary Differential Equations

Term

Fall 2015, Fall 2014, Fall 2013
Spring/Summer 2014
Spring/Summer 2016, Spring/Summer
2015

»»» Skills Teaching/Research Development

- » **Software and Programming languages:** MATLAB, Mathematica, R, Python, C#, COMSOL, SPSS, MS Office, Google suite, \LaTeX , Maple, ODOO.

» MathWorks

- Deep Learning and Machine Learning for Signal Processing Applications, February 2021.
- Introduction to Mapping: Import, Transform, and Display Geographical Data, February 2021.

» Pearson

- Teaching Students to Experiment in Linear Algebra, April 2021.
- Active Inclusivity: Solutions to Prevent Students From Feeling Isolated in an Online or Remote Class, April 2021.
- Teaching Future Teachers: Active Learning in the Math Content Course, April 2021.
- Enhancing Critical Thinking Skill Formation: Getting Fast Thinkers to Slow Down, March 2021.
- Getting Students to Prepare for Class, March 2021.
- Communication Strategies for the Online Environment, March 2021.
- Identify Struggling Students, March 2021.
- Learner-Centered Online Mathematics Education, March 2021.

» UCF

- Using Interactive Figures to Develop Conceptual Understanding, March 2021.
- GPD231 - Presentation Skills-Online, March 2021, Pathway to Success.
- GPD226 - Planning Posters-Online, March 2021, Pathway to Success.
- GPD224: EndNote Citation Management, March 2021, Pathway to Success.
- Essentials of Online Teaching, Summer 2020.
- Teaching with Lecture Capture - Zoom Edition, Spring 2020.
- Essentials of Webcourses@UCF, Fall 2019.
- Oral Communication for Internationals, Fall 2016, Center for Multilingual Multicultural Studies/ELI.

»»» Professional Memberships

- » 2018 - Member of the American Mathematical Society
- » 2018 - Member of Society for Industrial and Applied Mathematics
- » 2018 - 2020 Member of the Math Alliance
- » 2019 - 2020 Member of the Math Association of America
- » 2018 - 2021 Vice president of the SIAM Student Chapter at University of Central Florida