Pablo F. Damasceno

North Campus Research Center
Building 10, G034
2800 Plymouth Rd.
Ann Arbor, MI 48109-2800

418 High Street
Ann Arbor, MI 48104-2800
damascus *at* umich . edu
www.personal.umich.edu/~damascus

EDUCATION

University of Michigan (2009 – 2015) — Ann Arbor, MI, USA
PhD, Applied Physics — Advisor: Sharon C. Glotzer
"*Using Entropic Forces for Targeted Pattern Design*"

University of Sao Carlos (2005 – 2009) — São Carlos, SP, Brazil
B.S., Physics — Advisor: José P. Rino
"*Pressure-Induced Structural Phase Transitions in 2D Systems*"

AFFILIATIONS, AND VISITING POSITIONS

Visiting Scholar (Roderich Gross' group). University of Sheffield, UK. (Nov. 2014)
Visiting Scholar (Daan Frenkel's group). Cambridge University, UK. (Oct. 2014)
Visiting Scholar (Frank Scheffold's group). University of Fribourg, CH. (July 2014)
University of Michigan's Center for the Study of Complex Systems (2012 – 2015)
University of Michigan's Applied Physics Program (2009 – 2015)

PROFESSIONAL EXPERIENCE

Teaching Assistant
Assembly Engineering (Graduate Level) — University of Michigan (2013)
Physics Principles for Biologists (Undergrad. Level) — University of Sao Carlos (2009)

Conference Co-Organization
Michigan Complexity Mini-Conference — Ann Arbor, USA. (2013, 2014)
Complex Systems Multidisciplinary Workshop — Ann Arbor, USA. (2012)
Annual Undergraduate Symposium — Sao Paulo. Brazil. (2006, 07, 08, 09)

Students Co-Mentorship (Glotzer's group)
Graduate Students: Paul Dodd, Andres Karas, Andrew Cadotte, Yina Geng.
Undergraduate Students: Erica Siismets, Manuel Sarmiento, Steve Zatzke.

JOURNAL REFEREE

Granular Matter (ISSN: 1434-5021) (2012 – present)

HONORS, AWARDS, AND DISTINCTIONS

Grants and Fellowships

Workshop Funding: "Kinetic Networks: from Topology to Design" (Santa Fe, 2015)
Workshop Funding: "Michigan Complexity Mini-Conference" (Ann Arbor – 2012, 13)
U Michigan Pre-doctoral Graduate Fellowship (2014)

Presentations, Publications and Conference Awards

Lindau Nobel Laureate Meeting (Selected for participation) Lindau, DE. (2014)
Poster Nomination. MRS Spring Meeting San Francisco, CA. (2014)
Article Selected for Synopsis (PRX) Phys. Review X, APS (2014)
Article Selected as *Hot Paper* Angew. Chemie Int. Ed. (2013)
Poster Award (3rd). 12th Mini Stat Mech Meeting Berkeley, CA. (2013)
Science Featured Paper + Interview Science Magazine, AAAS. (2012)
Talk of the Year: Applied Math Grad. Student Seminar Ann Arbor, MI. (2012)
Poster Award (1st): Intern. School "Enrico Fermi" Varenna, Italy. (2012)
Featured Illustration: (PRB) Phys. Review B, APS. (2009)

PEER-REVIEWED PUBLICATIONS

Google Scholar Citations (12/11/14): **242**

1. Engel, M; **Damasceno, PF**; Phillips, CL; Glotzer, SC **Nature Materials (2014)**
Computational Discovery of a one-component Icosahedral Quasicrystal

2. Chen, ER; Klotsa, D; Engel, M; **Damasceno, PF**; Glotzer, SC Phys Review X (2014)
Complexity in surfaces of densest packings for families of polyhedra

3. Young, KL; Personick, ML; Engel, M; **Damasceno, PF;** Angew Chem (2013)
Barnaby, SN.; Bleher, R; Li, T; Glotzer, SC; Lee, B; Mirkin, CA
A Directional Entropic Force Approach to Anisotropic Nanoparticle Assembly

4. **Damasceno, PF;** Engel, M; Glotzer, SC **Science (2012)**
Predictive Self-Assembly of Polyhedra into Complex Structures

5. **Damasceno, PF;** Engel, M; Glotzer, SC ACS Nano (2012)
Crystalline Assemblies and Densest Packings … and the Role of Directional Entropic Forces

6. **Damasceno, PF;** daSilva, CJ; Rino, JP; Cândido, L. J Low Temp Phys (2010)
Temperature and Pinning Effects on Driving a 2D Electron System on a Helium Film

7. DaSilva, CJ; Rino, JP; **Damasceno, PF;** Sherman, EYa; Phys Review B (2010)

Two-dimensional Coulomb solid with interaction anisotropy

8. **Damasceno, PF;** Gonçalves, LGV; Rino, JP; de Oliveira, RCM Phys Review B (2009)

Pressure-induced Structural Phase Transitions in a Two-Dimensional System

9. **Ferreira Damasceno, PF;** Rino, JP Rev. Brasil. Ens. Fís. (2006)

Analysis of a Slingshot and Helical Plastic Springs: a Case Study

CONFERENCE / SYMPOSIUM PUBLICATIONS:

10. **Damasceno, PF;** Rino, JP XV AUGM Conf. (2007)

Simulation of Physical Systems by Finite Elements Method

TALKS (multiple co-authors)

Invited (9):

1. "Self-Assembly across length scales". *Colloquium*. University of Sheffield. UK. (2014)
2. "What the Bees Know and What They Don't Know. Meanders on Shape, Packing and Self-Assembly in Nature". *Cambridge's Biological and Statistical Physics Discussion Group*. Cambridge. UK. (2014)
3. "Predictive self-assembly of polyhedra into complex structures". *Colloquium*. University of Twente. Enschede. Netherlands. (2012)
4. "What do the bees know and what they do not know". *Complex Systems Advanced Academic Workshop* (CSAAW). Ann Arbor. USA. (2012)
5. "Auto-organização: Usando as leis do universo em favor da nanociência (e além)". *Brazilian Research Network in Nanotechnology, Society and Environment*. São Paulo. Brazil (2012)
6. "A Física da Automontagem (*The Physics of Self-Assembly*). *VII Semana da Física da UFSCar"*. Sao Carlos. Brazil. (2011)
7. "Ciências, cientistas e outras profissões" (Science, Scientists and other jobs). *Instituto Dom Barreto High School*. Teresina. Brazil. (2011)
8. "Minha Trajetória como um Físico" (My Path as a Physicist). *Instituto Dom Barreto High School*. Teresina. Brazil. (2011)
9. "Scaling Up your Research with Computer Simulations" *Physics Graduate Student Symposium*. Ann Arbor. USA. (2011)

Contributed (16):

10. "Entropic Utopia: Shaping disorder for targeted self-assembly across length scales". Colloquium. *Theoretical Chemistry Seminar*. Cambridge. UK. (2014)
11. "Packing, Folding, Assembling, and Jamming". *Stat. Mech. Colloquium*. Berkeley. USA. (2014)

12. "More disordered than disorder: self-organization, microstates and why entropy might not be what you think". *Santa Fe Institute (SFI) Seminar*. Santa Fe. USA. (2014)
13. "What the Bees Know and What They Don't Know. Meanders on Shape, Packing and Self-Assembly". *Ecole Thématique du CNRS: Waves and Disorder*. Cargèse. FR. (2014)
14. "Lego: a Toy Model for Self-Assembly". *3rd Michigan Complexity Mini-Conference*. Ann Arbor. USA. (2014)
15. "Folding by Design". *MRS Spring Meeting*. San Francisco. USA. (2014)
16. "Cutting and Folding for Tunable Materials Properties". *APS March Meeting*. Denver. USA. (2014)
17. "Bio-Inspired Materials with Tunable Mechanical Properties". *AIChe Annual Meeting*. San Francisco. USA. (2013)
18. "The Role of Anisotropy for the Assembly of Hard Colloidal Nanoparticles". *AIChe Annual Meeting*. San Francisco. USA. (2013)
19. "Self-Assembly of Complex Crystals Through Building Block Design". *International Soft Matter Conference*. Rome. Italy. (2013)
20. "Crystallographic Tailoring: Self-Assembling Complex Crystals Through Building Block Design". *APS March Meeting*. Baltimore. USA. (2013)
21. "Packing versus Assembly in Systems of Hard Polyhedra". *MRS Fall Meeting*. Boston. USA. (2012)
22. "Packing, Jamming, Assembly and Folding: (some) Mathematics Behind Materials Design". *Applied Interdisciplinary Math Department*. Ann Arbor. USA (2012) – *Awarded
23. "Self-Assembly of non-Spherical Colloids". 2nd International *Workshop on Complex Physical Phenomena in Materials*. Porto de Galinhas. Brazil. (2012)
24. "Crystalline Assembly of Hard Polyhedra via Directional Entropic Forces". *APS March Meeting*. Boston. USA. (2012)
25. "Modelagem por Dinâmica Molecular de Transições de Fase Estruturais em Sistemas Bidimensionais". (Molecular Dynamics Simulation of Structural Phase Transition in 2D systems). Brazilian Young Researchers Symposium. São Carlos. Brazil. (2008)

POSTER PRESENTATIONS AT CONFERENCES (multiple co-authors) (21):

1. Experimental Investigation of Emergent Collective Phenomena in Systems of 3D-Printed Particles. *In:* International Conference on Intelligent Robots and Systems. Chicago (2014)
2. Predictive Assembly of Complex Phases via Interaction Design. *In:* Transformational Technologies in Molecular Simulations. Madison (2014)
3. Cutting and Folding for Tunable Materials Properties. *In:* MRS Spring Meeting. San Francisco (2014) – * Poster Nomination Award

4. Probing the Photonic Properties of Disordered, Quasicrystalline and Ordered Materials. *In:* Michigan – Purdue Photonics Workshop. West Lafayette (2014)
5. Computer Simulation Studies of Self-Assembly and Nano Material Design. *In:* Cyberinfrastructure (CI) Days. Ann Arbor (2013)
6. Ordered and Disordered Systems of Hard Convex Polyhedra. *In:* Geometry and Physics of Spatial Random Systems. Freudenstadt. Germany (2013)
7. Emergence of Structural Complexity in Systems of Entropic Agents. *In:* Michigan Complexity Mini-Conference. Ann Arbor (2013)
8. Assembling Complex Structures from Simple Building Blocks. *In:* "12th Berkeley Mini Stat Mech Meeting". Berkeley. (2013) – *Best Poster Award (3rd Place)
9. Self-assembly of Anisotropic Polyhedra. *In:* International School of Physics "Enrico Fermi". Varenna. Italy. (2012) – *Best Poster Award (1st Place)
10. Self-assembly of Imperfect tetrahedra. *In:* Advances in Percolation and Related Topics MCTP Workshop. Ann Arbor (2012)
11. Self-assembly of non-spherical shapes. *In:* 12th Experimental Chaos and Complexity Conference. Ann Arbor. (2012)
12. Self-assembly of Anisotropic Polyhedra into Complex Crystals. *In:* Cyberinfrastructure (CI) Days. Ann Arbor. (2012)
13. Self-Assembly of Imperfect Tetrahedra. *In:* AiChE Annual Meeting. Minneapolis. (2011)
14. The Role of Shape for the Crystallization of Nanotetrahedra. *In:* Workshop on Sphere Packing and Amorphous Materials. ICTP. Trieste. Italy. (2011)
15. The Role of Shape, Polydispersity and Softness for the Crystallization of Nanotetrahedra. *In:* Black Forest Focus on Soft Matter 5: Self-Assembly on all Scales. Saig. Germany. (2011)
16. Self-assembly of superchiral and quasicrystalline structures for photonic and negative index materials. *In:* AFOSR metamaterial review. Virginia Beach (2010)
17. Metal-Insulator transition of electrons on Helium film at finite temperature. *In:* XI Escola brasileira de estrutura eletrônica, Uberlândia (2008).
18. Transições de fase em sistemas bidimensionais usando um potencial de poço duplo. *In:* XXXI Encontro Nacional de Física da Matéria Condensada. (2008).
19. Pressure-induced structural phase transition in two-dimensional systems. *In:* Conference on Computational Physics. Ouro Preto (2008)
20. Simulação de sistemas físicos pelo método dos elementos finitos. *In:* 7a Jornada Científica da UFSCar. (2007)
21. Análise de estabilidades de redes bidimensionais. *In:* XIV Congresso de Iniciaçao Cientifica (2006)

CONFERENCES, SYMPOSIUMS AND SUMMER SCHOOLS ATTENDED:

International (10):

1. International Conference on Intelligent Robots and Systems. Chicago (2014)
2. Lindau Nobel Laureate Meeting. Germany. (2014)
3. Waves and Disorder Summer School. France. (2014)
4. International Soft Matter Conference. Italy. (2013)
5. Geometry and Physics of Spatial Random Systems. Germany. (2013)
6. Intern. Workshop on Complex Physical Phenomena. Brazil. (2012)
7. Intern. School of Physics "Enrico Fermi". Italy. (2012)
8. Workshop on Sphere Packing and Amorphous Materials. ICTP. Italy. (2011)
9. Black Forest Focus on Self-Assembly on all Scales. Germany. (2011)
10. Summer school in High Performance Computing. Italy. (2010)
11. Conference on Computational Physics. Brazil. (2008)
10. XV Symposium for Young Researchers. Paraguay. (2007)

National (30):

11. Transformational Technologies in Molecular Simulations. Madison. MI. (2014)
12. 3rd Michigan Complexity Mini-Conference. Ann Arbor MI. (2014)
13. MRS Spring Meeting. San Francisco CA. (2014)
14. Michigan – Purdue Photonics Workshop. Lafayette IN. (2014)
15. APS March Meeting. Denver CO. (2014)
16. CyberInfrastructure Days. Ann Arbor MI. (2013)
17. AIChe Annual Meeting. San Francisco CA. (2013)
18. The Evolution of Cooperation & The Framing of Peace. Ann Arbor MI. (2013)
19. Modeling the Dynamics of Norms and Culture. Ann Arbor MI. (2013)
20. APS March Meeting. Boston MA. (2013)
21. 2nd Michigan Complexity Mini-Conference. Ann Arbor MI. (2013)
22. APS March Meeting. Boston MA. (2012)
23. Advances in Percolation and Related Topics. Ann Arbor MI. (2012)
24. MRS Fall Meeting. Boston MA. (2012)
25. 12th Experimental Chaos and Complexity Conf. Ann Arbor MI. (2012)
26. CyberInfrastructure Days. Ann Arbor MI. (2012)
27. AIChe Annual Meeting. Minneapolis MN. (2011)
28. Petascale Programming, Environments and Tools. Urbana IL. (2010)
29. Proven Algorithmic Techniques for Many-core Proc. Ann Arbor MI. (2010)
30. AFOSR metamaterial review. Virginia Beach VA. (2010)

31. XVI Congress for Young Researchers. Brazil. (2008)
32. XXXI National Meeting on Condensed Matter Physics. Brazil. (2008)
33. XI Brazilian School of Electronic Structure. Brazil. (2008)
34. I Winter School (IFGW - Unicamp). Brazil. (2008)
35. III Physics week. Brazil. (2007)
36. XXII Theoretical Physics Journey. Brazil. (2007)
37. XVII Scientific Journey Brazil. (2007)
38. I Escola de Física Computacional Moderna. Brazil. (2006)
39. II Physics week. Brazil. (2006)
40. XIV Congress for Young Researchers. Brazil. (2006)

PROFESSIONAL REFERENCES:

Sharon C. Glotzer
Stuart W. Churchill professor
North Campus Research Center
Building 10, 2800 Plymouth Rd.
University of Michigan
Ann Arbor, MI 48109
sglotzer@umich.edu

Nicholas Kotov
Joseph B. and Florence V. Cejka Professor.
North Campus Research Center
Building 10, 2800 Plymouth Rd.
University of Michigan
Ann Arbor, MI 48109
kotov@umich.edu

Daan Frenkel
Trinity College Cambridge Professor
Department of Chemistry
The University Chemical Laboratory
Lensfield Road,
Cambridge CB2 1EW, UK
df246@cam.ac.uk

Hans J. Herrmann
Professor
Institute for Building Materials
HIF E 12, Stefano-Franscini-Platz 3
ETH
8093 Zürich, CH
hans@ifb.baug.ethz.ch

Scott Page
Leonid Hurwicz Prof. of Complex Systems
Center for the Study of Complex Systems
317 West Hall
University of Michigan
Ann Arbor, MI 48106
spage@umich.edu

Robert Ziff
Professor of Chemical Engineering
2630 Beyster
500 S State street
University of Michigan
Ann Arbor, MI 48109
rziff@umich.edu