



Outreach
Information
Session

Illinois
Geometry Lab

About Us

Combining
Two
Components

Outreach

Sample
Activity

Outreach Information Session

Illinois Geometry Lab

University of Illinois, at Urbana-Champaign

September 24, 2015



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Sample
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The IGL has two major components:

- 1 Research
- 2 Outreach

Conducting new research in mathematics is important

However, being able to communicate is vital



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- 1 Research
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However, being able to communicate is vital



Combining the Two Components

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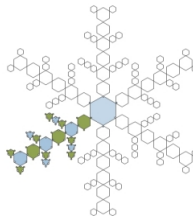
On the Geometry and Mathematical Modeling of Snowflakes and Viruses

IGL Project Spring 2014/Fall 2014

Faculty Mentor: Laura Schaposnik

Students:

- Chaofan Da,
- Christopher Formosa,
- Jessica Li, and
- Michelle Zosky.





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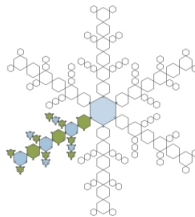
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Studied:

- 1 Geometric properties of snowflakes and icosahedral viruses,
- 2 Mathematical modeling for visualizing snowflakes,
- 3 3D printed snowflake puzzles.

Accomplishments:

- 1 **Semifinalist**, Jessica Li, The Siemens Competition
- 2 **Semifinalist**, Jessica Li, Intel Science Talent Search
- 3 **Preprint**, Jessica Li and Laura Schaposnik, "Interface control and snow crystal growth."



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Laura Schaposnik

For middle school students:

- 1 Looked at photos of ice crystals,
- 2 Built physical models,
- 3 Discussed snowflake modeling in the movie Frozen.



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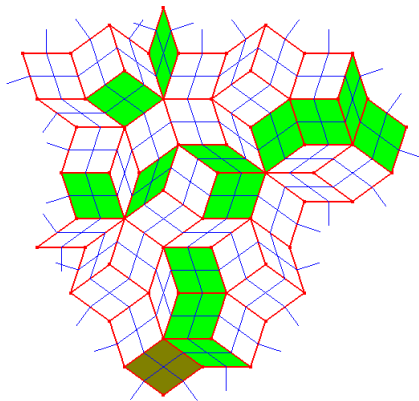
Stability of Quasicrystal Frameworks

IGL Project Spring 2013/Fall 2013/Spring 2014

Mentors: George Francis and Eliana Duarte

Students:

- Alex Burnley,
- Chong Hany,
- Keran Huang,
- Natchiket Joshi,
- Jonathan McGreal,
- Zachary Miksis,
- Daniel Pugliese, and
- Joseph Zeller.





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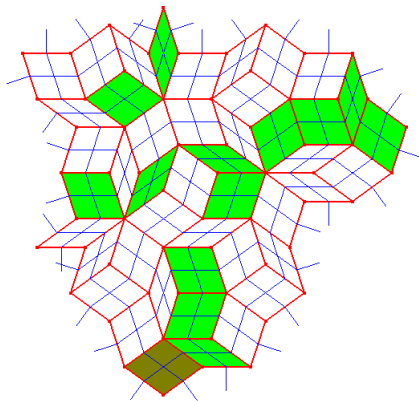
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Studied:

- 1 Found the minimum number of braced rhombi to make a 2D Penrose structure rigid
- 2 Coded interactive models.

Accomplishments:

- 1 **Paper**, Eliana Duarte and George Francis,
"Stability of Quasicrystal Frameworks in 2D and 3D."

2011 Nobel Prize in Chemistry, Dan Shechtman, "for the discovery of quasicrystals"



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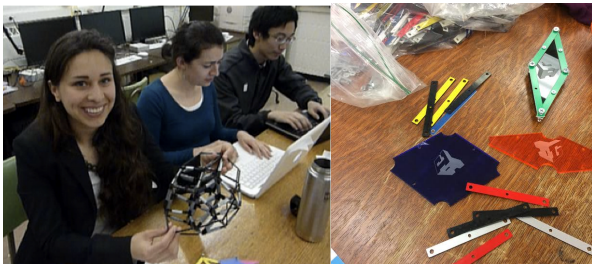
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For middle school students:

- 1 Proved small examples,
- 2 Built physical models.



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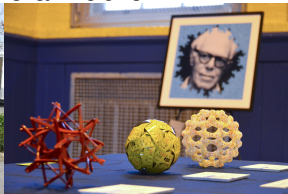
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■ Events with the General Public



■ School Field Trips (Elementary, Middle, and High School)





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■ Partnership with ChiPrep



■ Partnership with Association for Women in Mathematics





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This semester:

- Science at the Market - Saturdays October 10th, 17th
- GEMS Workshops - Saturdays October 10th, 17th, 24th
- Math Homecoming Party - October 24th
- ChiPrep - October 31, November 7, November 14
- Sonia Math Day - November 7th
- Various Field Trips



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
?			
?			
?			
?			
?			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron			
cube			
octahedron			
dodecahedron			
icosahedron			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron	4	4	6
cube			
octahedron			
dodecahedron			
icosahedron			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron	4	4	6
cube	6	8	12
octahedron			
dodecahedron			
icosahedron			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron	4	4	6
cube	6	8	12
octahedron	8	6	12
dodecahedron			
icosahedron			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron	4	4	6
cube	6	8	12
octahedron	8	6	12
dodecahedron	12	20	30
icosahedron			



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Platonic Solids

Polyhedron	# Faces	# Vertices	#Edges
tetrahedron	4	4	6
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octahedron	8	6	12
dodecahedron	12	20	30
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From here there are a number of possible directions:

- 1 Rock Specimens,
- 2 Soap Bubbles,
- 3 Modular Origami,
- 4 Archimedean Solids, etc.



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Thank you for listening!



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