Vincent J. Matsko

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Education

B.S., Mathematics, Carnegie Mellon University, 1986.

M.S., Mathematics, Carnegie Mellon University, 1989.

D.A., Mathematics, Carnegie Mellon University, 1993.

Employment History

Course Hero, 2019 – Present. I am writing solutions to calculus problems for an online learning platform, as well as reviewing the content of other authors.

Dulwich College International, 2018. I produced geometry videos for flipped classrooms and reviewed storyboards and videos of other videographers.

University of San Francisco, 2015 – 2018. I was an Assistant Professor of Mathematics at the University of San Francisco. I developed and taught a *Mathematics and Digital Art* course, the first of its kind at USF. I also began a Mathematics and Digital Art Club.

PredictWallStreet, LLC, 2015 – 2016. I was a mathematical consultant for a hedge fund.

Moving Parts LLC, 2014 – 2017. I was a puzzle designer and creative consultant for a new company based in Chicago, IL.

Princeton International School of Mathematics and Science, 2013 – 2014. I was a founding mathematics teacher of a new school for students especially talented in mathematics and science. I was responsible for developing a dynamic, creative mathematics curriculum, as well as taking on other duties as required when starting a new school.

Illinois Mathematics and Science Academy, 2007 – 2013. I taught four courses each semester. I introduced three new courses: *Polyhedra and Geometric Sculpture,* a course in three-dimensional geometry using a textbook I have written; and a two-semester advanced sequence in calculus. In addition, I reorganized the *Advanced Problem Solving* course.

Quincy High School, 2004 – 2007. I co-taught a senior course, *Polyhedra and Geodesic Structures,* using a textbook I have written. After learning theory, students apply their knowledge by designing and building polyhedra and geodesic spheres. Students have a unique opportunity to learn mathematics rarely taught at either the high school or undergraduate level.

Quincy University, 1993 – 2007. I was an Associate Professor of Mathematics at Quincy University, Quincy Illinois. My responsibilities included teaching twelve hours each semester, as well as serving as an academic advisor.

Quincy High School, 1997 – 1999. I contributed significantly to the design of a non-traditional problem-solving course for senior high school students who have taken calculus in their junior year. I also trained the teacher currently teaching the course.

Coach, Quincy High School Mathematics Team, 1994 – 2000. Each year, the QHS Math Team sends one student to an Oral Competition of the Illinois Council of Teachers of Mathematics Regional Mathematics Competition, the topic of which varies yearly. I served as a coach for this oralist.

Pennsylvania Governor's School for the Sciences, 1983 – 1992. The Pennsylvania Governor's School for the Sciences (PGSS) is a five-week summer institute for exceptional high school students hosted at Carnegie Mellon University. I designed and taught the Computer Science (CS) Core Course, the CS Laboratory Course, and the CS Project Course at various times. From 1990–1992, I collaborated with the Pittsburgh Supercomputing Center, developing courses which focused on massively parallel computing using the Connection Machine.

Westminster College, Academic Year 1988 – 1989. I served as a faculty member in the Department of Mathematics and Computer Science at Westminster College, a liberal arts college in western Pennsylvania. While there, I taught various calculus courses, a data structures course, and a discrete mathematics course. I was also involved in a faculty seminar designed to examine current trends in the liberal arts.

Invited Talks and Conferences

- *Pentomino Games,* as part of the 3^{rd} and 4^{th} Grade Family Math Night series at the Lamplighter School, Dallas, TX (January 2020).
- *Puzzling with Pentominoes,* as part of the Family Fridays series at the Museum of Mathematics, New York, NY (September 2019).
- *Platonic Solids,* workshop as part of the conference on the History of Mathematics in Mathematics Education, Jagodina, Serbia (October 2018).
- *Designing Binary Trees,* as part of the Mathematics Colloquium at the University of San Francisco, San Francisco, CA (September 2018).
- *Randomness and Structure in Computer-Generated Art and Design,* St. Mary's College, Moraga, CA (April 2016).
- *Randomness and Structure in Computer-Generated Art and Design,* as part of the Mathematics Colloquium at the University of San Francisco, San Francisco, CA (April 2015).
- *The Mathematics Curriculum at the Princeton International School of Mathematics and Science: Creativity and Innovation,* The 4^{th} National Principals' Training Symposium: Educating Talented Students, Beijing, China (March 2013).
- *On Kepler's Laws,* as part of the Physics and Mathematics Seminar Series at Elmhurst College, Elmhurst, IL (November 2012).

- *Teaching with Inquiry-Based Learning,* Institute for the Promotion of Teaching of Science and Technology (IPST), Bangkok, Thailand. During a three-week stay, I visited several schools and conducted workshops for high school teachers and IPST staff (Summer 2011). I returned in Summer 2012 to conduct a series of workshops on geometry, calculus, polyhedra, and pentominoes.
- Conducted geometry workshops for the Langton Institute for Young Mathematicians (Canterbury, Kent, UK) and BRG Kepler (Graz, Austria) (Summer 2009).
- *Edge Nets of Cubes,* Kappa Mu Epsilon, Western Illinois University, Macomb, IL (April 2007).
- Invited to attend the International Commission on Mathematical Instruction's Study 16 on Challenging Mathematics in Trondheim, Norway (June–July 2006).
- *Geometry Meets Algebra: The Archimedean Solids,* Induction ceremony of Kappa Mu Epsilon, St. Francis University, Joliet, IL (April 2006).
- *An Application of Spherical Geometry,* University of Northern Iowa's Mathematics Colloquium, Cedar Falls, IA (November 2005).

Professional Presentations

- International Congress on Mathematical Education
  - Co-chaired the Discussion Group on *Creativity in Mathematics Education,* 12th Quadrennial Conference, Seoul, South Korea (July 2012).
  - *The Role of Student Motivation in Developing and Assessing the Acquisition of Higher-Order Thinking Skills* (with Jay Thomas), 12th Quadrennial Conference, Seoul, South Korea (July 2012).
- International Committee on Mathematical Creativity and Giftedness
  - Program Committee, 8th Biennial Conference, Denver, CO, USA, (July 2014).
  - Symposium on *Mathematics and Competitions for Gifted Students,* 8th Biennial Conference, Denver, CO, USA, (July 2014).
  - Workshop on *Writing Original Mathematics Problems,* 8th Biennial Conference, Denver, CO, USA, (July 2014).
  - *Teaching Mathematics as Art,* 7th Biennial Conference, Busan, South Korea (July 2012).
  - *The Role of Student Motivation in Developing and Assessing the Acquisition of Higher-Order Thinking Skills,* 7th Biennial Conference, Busan, South Korea (July 2012).
  - *Creativity in Teaching Problem Solving,* 6th Biennial Conference, Riga, Latvia, (July 2010).
  - International Board Member 2010–2015 (elected at 6th Biennial Conference).

- World Federation of National Mathematics Competitions
  - *Grammars, Regular Expressions, and Finite-State Automata,* Biennial Conference, Riga, Latvia, (July 2010).
  - *Having Students Write Original Problems,* Biennial Conference, Riga, Latvia, (July 2010).
- National Council of Teachers of Mathematics
  - *Dodecahedron Day 2012,* Regional Meeting of the NCTM, Chicago, IL (November 2012).
- Meetings of the American Mathematical Society
  - *Permutahedra Relative to a Regular Polytope,* 964$^{\text{th}}$ AMS Meeting, Special Session on Polytopes, University of Kansas, Lawrence, KS (March 2001).
  - *Variations of Uniform Polyhedra,* 941$^{\text{st}}$ AMS Meeting, Special Session on Recent Progress in Elementary Geometry, University of Illinois, Urbana, IL (March 1999).
  - *Folding Parabolic Cylinders in Three and Higher Dimensions,* Joint Meetings of the AMS/MAA, Special Session on Mathematical Methods in Paper Folding, Baltimore, MD (January 1998).
  - *Some Four-Dimensional Convex Polyhedra,* Regional Meeting of the American Mathematical Society, Special Session on Arrangements of Hyperplanes, University of Iowa, Iowa City, (March 1996).
- Meetings of the Mathematical Association of America
  - *Image Processing: Sgraffito Simulation,* with Stephen Campbell (Manchester, UK), Joint Meetings of the AMS/MAA, Denver, CO (January 2020).
  - *Making Sequences and Series Accessible,* Joint Meetings of the AMS/MAA, Baltimore, MD (January 2019).
  - *Working with Magnus Wenninger,* Joint Meetings of the AMS/MAA, San Diego, CA (January 2018), as part of an Invited Paper Session I organized.
  - *The Combinatorics of Binary Trees,* Joint Meetings of the AMS/MAA, San Diego, CA (January 2018).
  - *Mathematics and Digital Art,* Joint Meetings of the AMS/MAA, Atlanta, GA (January 2017).
  - *Writing Original Problems in Calculus Classes,* Joint Meetings of the AMS/MAA, Seattle, WA (January 2016).
  - *Innovations in Calculus Assessment,* Joint Meetings of the AMS/MAA, Seattle, WA (January 2016).
  - *Fractals, Linear Algebra, Python, and Sage: A Linear Algebra Course for Computer Science Majors,* MathFest 2015, Washington, D. C. (August 2015).
  - *Reshuffling Calculus,* Joint Meetings of the AMS/MAA, San Antonio, TX (January 2015).

- *Color, Texture, and Geometry,* Joint Meetings of the AMS/MAA, San Antonio, TX (January 2015).
- *Color, Texture, and Geometry,* Regional Meeting of the MAA, University of Southern Florida, Sarasota – Manatee, FL (December 2014).
- *A Collatz-Like Iteration,* Joint Meetings of the AMS/MAA, Baltimore, MD (January 2014).
- *A Collatz-Like Iteration,* Regional Meeting of the MAA, Rutgers University, New Brunswick, NJ (October 2013).
- *A Collatz-Like Iteration,* Regional Meeting of the MAA, Roosevelt University, Chicago, IL (April 2013).
- *Teaching Mathematics as Art,* Regional Meeting of the MAA, Illinois State University, Normal, IL (March 2012).
- *On Kepler's Laws,* Regional Meeting of the MAA, North Central College, Naperville, IL (April 2011).
- *Envelopes of Conic Sections,* Regional Meeting of the MAA, Augustana College, Rock Island, IL (April 2010).
- *Fractals Produced by Affine Transformations,* Regional Meeting of the MAA, Bradley University, Peoria, IL (April 2009).
- *Edge Nets of Cubes,* and *Challenging Gifted High School Students,* MathFest 2008, Madison, WI (August 2008).
- *Conics, Linear Algebra, and Mathematica,* Regional Meeting of the MAA, Eastern Illinois University, Charleston, IL (April 2008).
- *Edge Nets of Cubes,* Regional Meeting of the MAA, Western Illinois University, Macomb, IL (March 2007).
- *Geometry Meets Algebra: The Archimedean Solids,* Regional Meeting of the MAA, North Central College, Naperville, IL (April 2006).
- *A High School Course on Polyhedra,* MathFest 2005, Albuquerque, NM (August 2005).
- *A High School Course on Polyhedra,* Regional Meeting of the MAA, Knox College, Galesburg, IL (April 2005).

- MOVES (Mathematics of Various Entertaining Subjects)
  - *Periodic Integer Sequences,* MOVES 2015, Museum of Mathematics, New York (August 2015).

- Geometric Potpourri Seminar, University of Illinois, Urbana-Champaign.
  - *On Kepler's Laws* (October 2010).
  - *Envelopes of Conic Sections* (November 2009).
  - *The Illustrated Salmon* (April 2008).
  - *Distinguishing Chromatic Numbers* (April 2007).
  - *Edge Nets of Cubes* (November 2006).
  - *Inverse Pedal Curves of Conic Sections* (November 2005).

- *Regular Polytopes* (November 2004).
- *Parabolas and Crescent Moons* (April 2004).
- *Envelopes* (November 2003).
- *n-gons* (April 2003).
- *Teaching a Course on Polyhedra* (October 2001).
- *Permutahedra Relative to a Regular Polytope* (March 2001).
- *Linear Cone Closures in Special Relativity* (April 2000).
- *Rhombi Inscribed in Unit Circles* (November 1998).
- *Some Polynomials Derived from Polyhedra* (November 1997).
- *A Classification of Convex Polygons* (April 1997).
- *Some Dodecahedral Stellations* (November 1996).
- *Multipermutahedra and Permutahedra* (February 1996).
- *Vertex-Finite Tilings in Three Dimensions* (November 1995).

- Organized a one-day geometry workshop featuring Magnus Wenninger (renowned polyhedral model builder) and Steve Luecking (Chicago-based sculptor) hosted by Quincy University's School of Science and Technology, Quincy IL (April 2005).

- *Polyhedra and Spatial Visualization Skills,* Conference of the Illinois Council of Teachers of Mathematics (Springfield, IL), (October 1996); Quincy Conference XXIV, Quincy, IL (October 1996); Conference of the Illinois Council of Teachers of Mathematics (Springfield, IL), (October 1995).

- *Improving Spatial Visualization Skills,* 44th Illinois Council of Teachers of Mathematics Western Regional Conference, Western Illinois University, Macomb, IL (March 1995).

Lecture Series

- *Building Polyhedra,* Quincy High School, 1994–1995; construction of various three-dimensional solids and investigation of relevant algebraic relationships.

- *An Introduction to Plane Inversive Geometry,* Upper St. Clair High School, 1992–1993; description of the limaçons of Pascal as envelopes of circles and the inverse conic sections as envelopes of lines.

- *An Introduction to Fractals,* Upper St. Clair High School, 1991–1992; discussion of Cantor sets as attractors of systems of contractive affine mappings.

Other Activities

Reviewer for the *Journal of Mathematics and the Arts* since 2017.

Reviewer for *Mathematics Magazine* since 2016.

Reviewer for *The College Mathematics Journal* since 2013, and Board Member from 2013–2018.

Brought the *Kangaroo* competition, an international mathematics competition taken annually by millions of students in grades 1–12, to IMSA from 2009–2012. 175 participants registered in 2012. I was also involved at the national level in editing problems and solutions for the US competition.

Attended ICME-11, the International Commission on Mathematics Education's quadrennial conference, in Monterrey, Mexico (July 2008).

Bethel Institute, Quincy, IL, 9-11 July 1996. As part of an enrichment program for youth at the Bethel African Methodist Episcopal Church, I gave a three-workshop series on three-dimensional geometrical constructions.

Mathematical Association of America, member since 1993. Regional Board Member from 2009–2012.

American Mathematical Society, member since 1987.

Publications

Klauser, Todd, Vincent J. Matsko, and Sandra Spalt-Fulte, *Challenging Gifted High School Students,* Mediterranean Journal for Research in Mathematics Education, Vol. 6, 1 & 2, 3-22, 2007.

Matsko, Vincent J., *Quadratics and the Floor Function,* Mathematics Magazine, Vol. 93, No. 2, April 2020, pp. 104–112.

Matsko, Vincent J., *Lattice dissections: plainer and less fancy,* The Mathematical Gazette, Vol. 102, No. 555, November 2018, pp. 454–459.

Matsko, Vincent J., *Number Search,* on the Puzzle Page of MAA Focus, December 2017/January 2018, p. 33.

Matsko, Vincent J., *Designing Koch-Like Curves,* The College Mathematics Journal, Vol. 49, No. 1, January 2018, pp. 11–19.

Matsko, Vincent J., *Koch-Like Fractal Images,*, in E. Torrence, B. Torrence, C. Séquin, D. McKenna, K. Fenyvesi, and R. Sarhangi, eds., *Proceedings of Bridges 2016: Mathematics, Music, Art, Architecture, Education, Culture,* Tessellations Publishing, 2016, pp. 293–300.

Matsko, Vincent J., *Koch-Like Fractal Images,* Symmetry: Culture and Science, Vol. 27, No. 4, 2016, pp. 403–416.

Matsko, Vincent J., *Salade Producto,* Journal of Humanistic Mathematics, Volume 6 Issue 1 (January 2016), p. 306. DOI: 10.5642/jhummath.201601.26. Available at: http://scholarship.claremont.edu/jhm/vol6/iss1/26.

Matsko, Vincent J., *Random Walks on Vertices of Archimedean Tilings,* in G. Greenfield, G. Hart, and R. Sarhangi, eds., *Proceedings of Bridges 2015: Mathematics, Music, Art, Architecture, Culture,* Tessellations Publishing, 2015, pp. 439–442.

Matsko, Vincent J., *Color, Texture, and Geometry,* in G. Greenfield, G. Hart, and R. Sarhangi, eds., *Proceedings of Bridges 2014: Mathematics, Music, Art, Architecture, Culture,* Tessellations Publishing, 2015, pp. 205–210.

Matsko, Vincent J., *Second-Order Recurrences with Nonconsecutive Initial Conditions,* The College Mathematics Journal, Vol. 45, No. 1, January 2014, pp. 41–49.

Matsko, Vincent J., *Generic Ellipses as Envelopes,* Mathematics Magazine, Vol. 86, No. 5, December 2013, pp. 358–364.

Matsko, Vincent J., *Calculus Reshuffled,* NCSSSMST Journal, Fall 2013, Volume 18, Issue 1, pp. 24–25.

Matsko, Vincent J., *Grammars and Finite-State Automata,* Journal of the World Federation of National Mathematics Competitions, Volume 23, Number 2 (2010), pp. 46–54.

Matsko, Vincent J., et al., *Mathematics in Context: Focusing on Students,* ICMI Study Series 16, Springer, 2009.

Matsko, Vincent J., *Polyhedra and Geodesic Structures* (draft manuscript), 2005–2008.

Matsko, Vincent J., *The Parable of the Lucky Student?,* The College Mathematics Journal, Vol. 33, No. 3, May 2002, pp. 230-232.

Matsko, Vincent J., *De Moivre's rule, recurrence relations and number theory,* Mathematics & Informatics Quarterly, Volume 8, 1/98, pp. 12-14.

Matsko, Vincent J., and Jerald Thomas, *Beyond Routine: Fostering Creativity in Mathematics Classrooms,* in F. Singer, N. Ellerton, and J. Cai, eds., *Mathematical Problem Posing: From Research to Effective Practice,* Springer, 2015, pp. 125–139.

Matsko, Vincent J., and Jerald Thomas, *The Problem is the Solution: Creating Original Problems in Gifted Mathematics Classes,* Journal for the Education of the Gifted, Vol. 37, No. 2, 2014.

Mendler, Nick and Matsko, Vincent J., *Symmetric Binary Trees with Branching Ratios Larger than 1,* in D. Swart, C. Séquin, and K. Fenyvesi, eds., *Proceedings of Bridges 2017: Mathematics, Art, Music, Architecture, Education, Culture,* Tessellations Publishing, 2017, pp. 507–510.

Wetzel, John E., Vincent J. Matsko, and Douglas B. West, *Trifold arrangements and cevian dissections,* Journal of Geometry, **72** (2001) pp. 115-127.

Art and Mathematics

Exhibitions

2018 *Sierpinski* and *Galaxy,* Joint Mathematics Meetings Art Exhibition, San Diego, CA.

2017 *Sierpinski,* invited to exhibit at the The Purdue University Department of Computer Science and the Rueff School of Visual and Performing Arts educational biennial exhibit examining the intersection of art and science.

2017 *Two Koch-Like Curves,* Art Exhibition, Regional Meeting of the MAA, Santa Clara University, Santa Clara, CA.

2017 *Two Koch-Like Curves,* Joint Mathematics Meetings Art Exhibition, Atlanta, GA.

2016 *Spiral I* and *Fractal Curve +11 +191 +11,* Bridges 2016, Jyväskylä, Finland.

2016 *Fractal* and *Spiral I,* Art Exhibition, Regional Meeting of the MAA, University of California, Davis, CA.

2016 *Fractal Images,* Joint Mathematics Meetings Art Exhibition, Seattle, WA.

2015 *Random Walks,* Joint Mathematics Meetings Art Exhibition, San Antonio, TX.

2013 *Recent Works,* Princeton International School of Mathematics and Science in Princeton, NJ. Solo exhibition.

Courses

Designed and taught a *Mathematics and Digital Art* course at the University of San Francisco for three semesters.

Course description: What is digital art? It is easy to make a digital image, but what gives it artistic value? This question will be explored in a practical, hands-on way by having students learn how to create their own digital images and movies in a laboratory-style classroom. We will focus on the Sage/Python environment, and learn to use Processing as well. There will be an emphasis on using the computer to create various types of fractal images. No previous programming experience is necessary.

Invited Talks

Randomness and Structure in Computer-Generated Art and Design, St. Mary's College, Moraga, CA (April 2016).

Presentations

A Mathematics and Digital Art Course, Bridges 2017, Waterloo, Ontario, Canada (July 2017).

Mathematics and Digital Art, Joint Meetings of the AMS/MAA, Atlanta, GA (January 2017).

Koch-Like Fractal Images, Bridges 2016, Jyväskylä, Finland (August 2016).

Koch-Like Fractal Images, Symmetry Festival – 2016, Vienna, Austria (July 2016).

Randomness and Structure in Computer-Generated Art and Design, MathFest 2015, Washington, D. C. (August 2015).

Random Walks on Vertices of Archimedean Tilings, Bridges 2015, Baltimore, MD (July 2015).

Randomness and Structure in Computer-Generated Art and Design, as part of the Mathematics Colloquium at the University of San Francisco, San Francisco, CA (April 2015).

Color, Texture, and Geometry, Joint Meetings of the AMS/MAA, San Antonio, TX (January 2015).

Color, Texture, and Geometry, Regional Meeting of the MAA, University of Southern Florida, Sarasota – Manatee, FL (December 2014).

Publications

Matsko,Vincent. J., *Designing Koch-Like Curves,* The College Mathematics Journal, Vol. 49, No. 1, pp. 11–19.

Matsko, Vincent J., *A Mathematics and Digital Art Course,* in D. Swart, C. Séquin, and K. Fenyvesi, eds., *Proceedings of Bridges 2017: Mathematics, Art, Music, Architecture, Education, Culture,* Tessellations Publishing, 2017, pp. 261–268.

Mendler, Nick and Matsko, Vincent J., *Symmetric Binary Trees with Branching Ratios Larger than 1,* in D. Swart, C. Séquin, and K. Fenyvesi, eds., *Proceedings of Bridges 2017: Mathematics, Art, Music, Architecture, Education, Culture,* Tessellations Publishing, 2017, pp. 507–510.

Matsko, Vincent J., *Koch-Like Fractal Images,* Symmetry: Culture and Science, Vol. 27, No. 4, 2016, pp. 403–416.

Matsko, Vincent J., *Koch-Like Fractal Images,*, in E. Torrence, B. Torrence, C. Séquin, D. McKenna, K. Fenyvesi, and R. Sarhangi, eds., *Proceedings of Bridges 2016: Mathematics, Music, Art, Architecture, Education, Culture,* Tessellations Publishing, 2016, pp. 293–300.

Matsko, Vincent J., *Random Walks on Vertices of Archimedean Tilings,* in G. Greenfield, G. Hart, and R. Sarhangi, eds., *Proceedings of Bridges 2015: Mathematics, Music, Art, Architecture, Culture,* Tessellations Publishing, 2015, pp. 439–442.

Matsko, Vincent J., *Color, Texture, and Geometry*, in G. Greenfield, G. Hart, and R. Sarhangi, eds., *Proceedings of Bridges 2014: Mathematics, Music, Art, Architecture, Culture,* Tessellations Publishing, 2015, pp. 205–210.