

# Jeffrey Ventrella

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ventrella.com

Pioneer in animated artificial life, algorithmic art, fractal geometry, and simulation-based games, with contributions to virtual world design and avatar virtual body language. Co-founded the virtual world There.com, and invented interactive experiences in Second Life. Published across disciplines of art, science, and evolutionary computation. Worked in academia and the tech industry, as well as ongoing independent research.



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Massachusetts Institute of Technology ( <a href="#">The Media Lab</a> )	MS	Media Arts and Sciences	1994
Syracuse University	MFA	Computer Graphics/Video	1987
Virginia Commonwealth University	BFA	Art Education/Art History	1984

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## Key Contributions

- \* Innovator in artificial life simulation and evolutionary art
- \* Co-founder and Principal Inventor of the virtual world There.com
- \* Designed avatar systems and interaction design in Second Life
- \* Creator of the GenePool artificial life simulation
- \* Inventor of the Clusters particle system
- \* Longstanding integration of mathematics, art, and evolutionary computation

See the full archive of lectures, exhibits, publications, and employment at: [ventrella.com/about](http://ventrella.com/about)

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## Lectures/Presentations

### San Francisco, California

Presented space-filling curve research at [Gathering for Gardner](#) 2/26

### Kyoto, Japan (virtual)

Darwin's Chorus: a collaboration with algorithmic composer Canton Becker: an interactive evolutionary ambient soundscape built upon the Gene Pool simulation; Artificial Life '25 Conference 10/25

### Richmond, Virginia

Presented "Particlehedra" at the Bridges Math/Art conference, VCU (alma mater) 8/24

### Sapporo, Japan (virtual)

Vestibular Bipeds - research on physically-based tetrahedral simulation that evolves locomotion: <https://direct.mit.edu/isal/proceedings/isal2023/35/29/116855> 7/23

<b>Helsinki, Finland (virtual)</b> Presented "Composite Number Polyrythms: Animating and Sonifying the Divisor Plot" Bridges Math/Art Conference	8/22
<b>Linz, Austria</b> Presented paper on fractal curve techniques at the <a href="#">Bridges Math/Art conference</a>	6/19
<b>Palo Alto, California</b> Presented original research at Stanford University as part of the MediaX series <a href="https://mediax.stanford.edu/events/artificial-life-meets-augmented-reality">https://mediax.stanford.edu/events/artificial-life-meets-augmented-reality</a>	4/17
<b>Santa Barbara, California</b> Presented <a href="#">keynote</a> at the <a href="#">Immersive Learning conference</a>	6/16
<b>Barcelona, Spain</b> Presented keynote presentation at <a href="#">VISIGRAPP</a> conference	2/13
<b>Vancouver, BC, Canada</b> Gave keynote presentation at International Symposium on Computational Aesthetics in Graphics, Visualization, and Imaging: a SIGGRAPH co-located conference.	8/11
<b>Laval, France</b> Gave the first keynote at the <a href="#">Laval Virtual</a> conference	4/11
<b>Los Angeles, California</b> <i>Virtual Body Language</i> Presented avatar expression at an invitation-only workshop at <a href="#">ICT, USC</a>	2/11
<b>Banff, Alberta, Canada</b> <i>Self-Portraits in Mandelbrot Genetics</i> <a href="#">Smart Graphics</a> . Presented mathematically-generated artworks	6/10
<b>Toronto, Ontario, Canada</b> <i>The Gestural Turing Test</i> <a href="#">AAMAS</a> Presented motion-capture experiment in nonverbal communication and believability (details available at <a href="http://gesturalturingtest.com/">http://gesturalturingtest.com/</a> )	5/10
<b>Melbourne, Australia</b> <i>Workshop Lecturer - ACAL</i> - Presented ecological simulation using planetary toy physics, emphasizing Open, collaborative development	12/09
<b>Palm Springs, California</b> <i>Keynote Speaker. HPC Horizons.</i> How genetics, physics, and communication can be represented for efficient traversal over the internet for virtual worlds. Other Keynote speakers were Craig Venter and Jaron Lanier.	3/08
<b>Boston, Massachusetts</b> <i>Prime Numbers are the Holes Behind Complex</i> <i>Composite Patterns</i> (The <a href="#">Divisor Plot</a> ) at the <a href="#">7<sup>th</sup> International Conference</a> on Complex Systems	10/07

<b>Vancouver, BC, Canada</b> <i>Online Body Language - Expressivity and Identity in Avatars and Autonomous Creatures</i> <a href="#">School of Interactive Art and Technology</a> (SFU) Research Colloquium	9/07
<b>Boston, Massachusetts</b> <i>Physical Avatar – a new technology for Second Life</i> <a href="#">SIGGRAPH</a> conference Tech Talk	8/06
<b>Bloomington, Indiana</b> <i>A Particle Swarm Selects for Evolution of Gliders</i> <i>in Non-uniform 2D Cellular Automata</i> - paper presented at <a href="#">Alife X</a> conference	6/06
<b>Bilbao, Spain</b> Conducted workshop at the <a href="#">Universidad del Pais Vasco</a> on <i>techniques for using mathematics to generate portraits. Presented interactive</i> <i>and print work at La 17 Exposición de Audiovisuale.</i>	12/04
<b>Stanford University, Palo Alto, CA</b> <i>Avatar-Centric Communication in There,</i> co-lectured with Dr. <a href="#">Chuck Clanton</a> , at the <a href="#">Human-Computer Interaction Seminar</a>	4/03
<b>Dundee, Scotland</b> <i>Artful Biology: Simulated Creatures for Software Entertainment,</i> presented at International <a href="#">Centre for Computer Games and Virtual Entertainment</a>	2/01
<b>Paris, France</b> <i>Avatar Physics and Genetics,</i> presented at <a href="#">Virtual Worlds, 2000</a>	7/00
<b>Los Angeles, CA</b> <i>Attractiveness vs. Efficiency (How Mate Preference Affects</i> <i>Locomotion in the Evolution of Artificial Swimming Organisms)</i> - presented at Artificial Life VI	6/98
<b>Geneva, Switzerland</b> <i>Disney Meets Darwin -</i> Paper presented at <a href="#">Computer Animation, '95</a>	4/95
<b>Cambridge, MA</b> <i>Explorations in the Emergence of Morphology and Locomotion</i> <i>Behavior in Animated Characters</i> - Paper presented at <a href="#">Artificial Life IV</a> , MIT	7/94
<b>Syracuse, NY</b> Fractal Geometry in Art - The Mandelbrot Colloquium, with four other speakers <i>including Dr. Mandelbrot</i>	11/86

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## Published Works

### The Menagerie of Space-filling Curves

To be published as a chapter in the book: Handbook of the Mathematics of the Arts and Sciences, ed. Bharath Sriraman, Springer Nature, 2026  
<http://www.fractalcurves.com/Menagerie.pdf>

### Particlehedra

Bridges Math/Art conference proceedings 2024  
<https://archive.bridgesmathart.org/2024/bridges2024-195.html#gsc.tab=0>  
<https://ventrella.com/particlehedra/>

### **Vestibular Bipeds**

Published in Artificial Life Proceedings, 2023  
<https://direct.mit.edu/isal/proceedings/isal2023/35/29/116855>

### **Composite Number Polyrhythms: Animating and Sonifying the Divisor Plot**

Paper published in Bridges 2022 Conference Proceedings, 2022

### **The Family Tree of Fractal Curves**

A book of original research, math, geometry: [fractalcurves.com](http://fractalcurves.com)

### **Embodied AI Characters for Emergent Narrative**

OurMedia Blog: <http://ourmedia.org/embodied-ai-characters-for-emergent-narrative/>

### **Brainfilling Curves – a Fractal Bestiary**

A color book about a system for discovering and rendering plane-filling fractal curves.

**[Book web site](#)**

### **From Ragdoll Physics to Expressive Avatars**

Paper published in the International Journal of Design and Innovation Research: 2011

**[see abstract](#)**

### **Virtual Body Language**

Currently available at [www.virtualbodylanguage.com](http://www.virtualbodylanguage.com) - published by [ETC Press](#) in 2011

**Self-Portraits in Mandelbrot Genetics** Springer: conference proceedings of [Smart Graphics](#), 2010

**The Gestural Turing Test** - published in the conference proceedings of [AAMAS](#), 2010

**Glider Dynamics on the Sphere: Exploring Cellular Automata on Geodesic Grids.** to be published in the Journal of Cellular Automata (Editor Andy Adamatzky)

<http://www.ventrella.com/Alife/Cells/GlidersOnSpheres.pdf>

**A Spherical XOR Gate Implemented in the Game of Life** to be published in the book: Game of Life Cellular Automata, Editor Andy Adamatzky, Springer.

**Evolving Structure in Liquid Music** [The Art of Artificial Evolution](#), Natural Computing Series, Springer-Verlag, Editors: Romero, J., and Penousal, M. November, 2007

<http://www.springer.com/west/home/computer/foundations?SGWID=4-156-22-173745009-0>

**Evolving The Mandelbrot Set to Imitate Figurative Art** [Innovations in Evolutionary Design](#), Natural Computing Series, Springer-Verlag, Editors: Hingston, P., Barone, L., and Michalewicz, Z. Berlin, 2007

<http://www.ventrella.com/Tweaks/Portraits/EvolvingMandelbrot.pdf>

**Gliders and Riders - A Particle Swarm Selects for Coherent Space-time Structures in Evolving Cellular Automata** – a chapter in [Stigmergic Optimization](#), from the Studies in Computational Intelligence Series. Vol 21, Springer-Verlag. eds. Ajith, Grosan, and Ramos. page 131, 2006

<http://www.springer.com/east/home/computer?SGWID=5-146-22-173661230-0>

**GenePool – Exploring the Interaction Between Natural Selection and Sexual Selection** –Chapter 4 in [Artificial Life Models in Software](#). ed. Andrew Adamatzky and Maciej Komosinski. Springer, 2005. Page 81

<http://www.springerlink.com/content/tv10101372574541/>

**Animated Artificial Life**, Chapter 3 in [Virtual Worlds \(Synthetic Universes, Digital Life, and Complexity\)](#) (ed. Heudin, J.C.) Perseus Books, 1999 pages 67-94

[http://www.ventrella.com/Alife/Animated/animated\\_0.html](http://www.ventrella.com/Alife/Animated/animated_0.html)

**A Computergraphical Model of Multi-Generational Family Systems**, chief author and editor (with James H. Amodio, MPS, and Thomas J. Schur, MSW), in *Social Science Computer Review*, Spring 1991 Volume 9 Number 1, pages 13-26  
<http://ssc.sagepub.com/cgi/content/abstract/9/1/13>

**A Particle Swarm Selects for Evolution of Gliders in Non-uniform 2D Cellular Automata** published in *Alife X conference proceedings*, MIT Press, 2006  
<http://www.ventrella.com/Alife/Cells/GlidersAndRiders/SwarmGliders.pdf>

**Avatar Physics and Genetics**, published in *Virtual Worlds*, 2000 (ed. Heudin, J.C.), Springer-Verlag Berlin/Heidelberg  
<http://portal.acm.org/citation.cfm?id=647690.731011&coll=GUIDE&d=GUIDE&CFID=15151515&CFTOKEN=6184618>

**Designing Emergence in Animated Artificial Life Worlds**, *Virtual Worlds*, 98 (ed. Heudin, J.C.) 1998, Springer-Verlag pages 143-155 <http://portal.acm.org/citation.cfm?id=733452>

**Attractiveness vs. Efficiency: (How Mate Preference Affects Locomotion in the Evolution of Artificial Swimming Organisms)**, *Artificial Life VI*, 1998, MIT Press  
<http://portal.acm.org/citation.cfm?id=286160&d=&coll=&CFID=15151515&CFTOKEN=6184618>

**Sexual Swimmers: Emergent Morphology and Locomotion Without a Fitness Function**, *From Animals to Animats*, (page 484) 1996, MIT Press [http://www.ventrella.com/Alife/Sexual/sexual\\_0.html](http://www.ventrella.com/Alife/Sexual/sexual_0.html)

**Disney Meets Darwin: The Evolution of Funny Animated Figures**, *Computer Animation '95 Proceedings - Geneva Switzerland* <http://portal.acm.org/citation.cfm?id=791214.791452>

**Explorations in the Emergence of Morphology and Locomotion Behavior in Animated Characters**, *Artificial Life IV proceedings*, MIT Press, 1994

Collaborated with Seymour Papert on creation of five illustrations for his book: **The Children's Machine (Rethinking School in the Age of the Computer)**, 6/93

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## Employment

<b><u>University of Maryland Institute for Bioscience</u></b> College Park, Maryland <b>Developer/designer (Contract)</b>	7/20 – 7/25
Developed high-end interactive virtual reality applications for NMR data visualization; development of front-end for nmrPipe/nmrDraw, with Dr. Frank Delaglio	
<b>EyeBrain Media</b> Petaluma, CA <b>Owner/Developer/Designer</b>	1/20 – current
Several ongoing projects including successful innovative generative NFT collaborations with Canton Becker, and math visualizations with Michael Dunworth,	
<b><u>EndlessOS Hack</u></b> , San Francisco, CA <b>Digital Toymaker (Contract)</b>	8/18 – 12/18
Designed and implemented the first game for the Hack product	
<b>MeshOS</b> , Sausalito, CA <b>Designer/Engineer (Contract)</b>	2/17 – 6/18
Consulted on design and interaction for the MeshOS system	

<p><b><u>Leap Motion</u></b>, San Francisco, CA  <b>Designer/Engineer (Contract)</b>          Worked with engineers to implement my original <u>Clusters</u> algorithm in VR</p>	<p>4/17 – 12/17</p>
<p><b><u>Wiggle Planet, LLC</u></b>, Petaluma, CA  <b>Founder</b>          Developed kid-friendly mobile apps featuring self-animated characters and artificial life with geo-located augmented reality</p>	<p>10/12 – 1/18</p>
<p><b><u>Virtuocity VR, Inc.</u></b> London, UK  <b>Developer/Designer (Contract)</b>          R&amp;D in a virtual reality application using the Samsung GearVR and Unity</p>	<p>8/16 – 12/16</p>
<p><b><u>Pillantas, Inc.</u></b> San Francisco, CA  <b>Developer (Contract)</b>          R&amp;D using the Microsoft HoloLens; developed prototypes in Unity/Windows 10 for a highly-innovative augmented reality interface</p>	<p>6/16 – 8/16</p>
<p><b><u>Binary Simplex</u></b> Washington, DC  <b>Developer (Contract)</b>          Implementing cross-platform (iOS and Windows) rendering tools for patented optimized 3D mesh generation based on DICOM files.</p>	<p>1/15 – 12/15</p>
<p><b><u>High Fidelity</u></b> San Francisco, CA  <b>Developer (Contract)</b>          Helped build-out core avatar systems, user interactions, particle systems, camera behaviors, and other virtual world features</p>	<p>4/13 – 8/13</p>
<p><b><u>Visual Music Systems</u></b>, Boston, MA  <b>Principal Developer</b>          Developed high-performance, realtime computer animation for a performative artform incorporating immersive displays and gestural input. Particle systems, 3D math/physics, and parameter-based control</p>	<p>6/11 – 9/12</p>
<p><b><u>The Internet Archive</u></b> San Francisco, CA  <b>Designer/Engineer (Contract)</b>          Worked closely with internet visionary <b><u>Ted Nelson</u></b> on implementation of ZigZag for the <b><u>Open Library</u></b>. Project management, JavaScript/HTML5/CSS development</p>	<p>10/10 – 11/10</p>
<p><b><u>School of Interactive Arts and Technology</u></b>, SFU, Vancouver, BC  <b>Research Scholar</b>: nonverbal communication in virtual worlds.          Taught Advanced Game Design class to 4<sup>th</sup>-year students.          Wrote the book: <i>Virtual Body Language</i>: <a href="http://www.virtualbodylanguage.com">www.virtualbodylanguage.com</a></p>	<p>9/09 – 8/10</p>
<p><b><u>The Internet Archive</u></b> San Francisco, CA  <b>Developer/Designer</b>: built home page for <b><u>NASAImages.org</u></b>; designed and Implemented the 'create account' page and other pages. Helped design the Open Library Book reader using JavaScript/CSS.</p>	<p>3/08 – 7/09</p>
<p><b><u>Centre for Digital Media</u></b> Vancouver, BC  <b>Faculty</b>: Developed curriculum and taught <b><u>Building Virtual Worlds</u></b>, advised students on industry-funded projects</p>	<p>8/08 – 12/08</p>

<p><b><u>Linden Lab (Second Life)</u></b> San Francisco, CA  <b>Senior Developer:</b> Developed software and designs for Second Life, invented Flexi Prims, <a href="#">FollowCam</a>, vehicle physics, camera behavior, <a href="#">avatar customization</a>, and user interfaces</p>	1/05 – 11/07
<p><b><u>Adobe Systems</u></b> San Jose, CA  <b>Programmer:</b> Worked with the <a href="#">Acrobat 3D</a> team (originally Adobe Atmosphere), developed JavaScript for direct manipulation, modeling, and interactive behavior of 3D content</p>	2/04 – 7/05
<p><b><u>There, Inc</u></b> Menlo Park, CA  <b>Co-Founder and Principal Inventor of <a href="#">There.com</a></b>          Developed prototype with Will Harvey April 1997 to April 1998; co-founded company with Will on April 1998. Invention of technologies and designs for avatars, vehicle physics and navigation, camera behavior, sound design, animal behaviors, and real-time voice-activated speech animation. Principal author on first <a href="#">patent</a> granted to the company.</p>	4/97 – 1/04
<p><b><u>Rocket Science Games, Inc.</u></b> San Francisco, CA  <b>Designer/Engineer:</b> Designed and prototyped software games. Worked with author <a href="#">Michael Crichton</a> on a game prototype. Designed <a href="#">Darwin Pond</a></p>	7/95 – 4/97
<p><b><u>ABSOLUT Vodka</u></b> (via <a href="#">TBWA/Chiat Day</a> NY, NY)  <b>Artist/Programmer:</b> Developed code to generate stylized genetic algorithm-based variations of the <a href="#">Absolut Vodka Bottle</a> using interactive evolution. Published online as promotion for the "Absolut Kelly" web site, Consulted with <a href="#">Kevin Kelly</a> on the site</p>	2/96 – 5/96
<p><b><u>Tufts University, Experimental College</u></b>, Medford, MA  <b>Instructor:</b> Designed and taught course: "Populating Virtual Reality". (Artificial Life: cultural implications, technical aspects).</p>	1/95 – 3/95
<p><b><u>Papyrus Design Group</u></b>, Somerville, MA  <b>Designer:</b> Developed script and consulted on animated characters for proposed CD-ROM-based interactive comedy game.</p>	12/94 – 3/95
<p><b><u>Cinergi Productions</u></b> Lenox, MA  <b>Artist/Programmer:</b> Feature Film Special Effects Animator, (Sylvester Stallone Film, <i>Judge Dredd</i>) Programmed custom animation effects on SGI IRIS; collaborated artists.</p>	7/94 – 8/94
<p><b><u>Visible Language Workshop, MIT Media Lab</u></b>, Cambridge, MA  <b>Research Assistant:</b> multimedia interfaces, AI, information design, and animation.</p>	9/92 – 3/94
<p><b><u>University of California, San Diego, Visual Arts Dept.</u></b> San Diego, CA  <b>Instructor:</b> Worked under <a href="#">Harold Cohen</a>, developed curricula and taught courses in Graphics Programming, 3D CAD, and C Language</p>	1/92 – 6/92
<p><b><u>Syracuse University</u></b>  <b>Computer Graphics Specialist,</b> Created Scientific Data Visualizations for supercomputer research. Taught workshops; Produced videotapes; Acquired video equipment, Attended Data Visualization Workshops at <a href="#">NCSA</a>.</p>	7/87 – 12/91