

Naveen Sundar Govindarajulu

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BIO

Naveen Sundar G. is an International Fulbright Science and Technology scholar pursuing his Ph.D. in Computer Science at RPI in the Rensselaer Artificial Intelligence and Reasoning Laboratory (RAIR Lab). His research focuses on formal Computer Science and AI. He has an active interest in the philosophy of the mind and AI and what can be brought to light about minds by studying mathematical cognition. Before RPI, he studied physics and electrical engineering, and applied machine learning to biometric and pattern recognition problems.

EDUCATION

Ph.D., Computer Science
Rensselaer Polytechnic Institute, Troy, New York Current GPA 4.00/4.0 (as of March, 2012) Summer 2013

Bachelor in Engineering, Electronics and Electrical Engineering
Birla Institute of Technology and Science (BITS), Pilani. India GPA 9.60/10 June 2007

Master of Science, Physics
Birla Institute of Technology and Science, Pilani. India GPA 9.60/10 June 2007

AWARDS, GRANTS and BURSARIES

- International Fulbright Science and Technology Award, 2008-2011.
- GE Foundation Scholar-Leader Award, 2004-2006.
- Best Academic Performance and Best All-Round Performance Awards for the Physics class of 2007, BITS-Pilani.
- International Association of Philosophy and Computing Student Travel Bursary for *The First International Conference of IACAP, Celebrating 25 years of Computing and Philosophy (CAP) conferences: "The Computational Turn: Past, Presents, Futures?"*, Aarhus University July 4-6, 2011.
- Offered a travel bursary from the *Future of Humanity Institute*, Oxford.

PROFESSIONAL EXPERIENCE

Rensselaer Polytechnic Institute June 2009 - present
Graduate Researcher, Rensselaer AI & Reasoning Laboratory (RAIR Lab)

- The Robot Devolution Game: Implementing and designing the world's first uncomputable game. See <http://www.cs.rpi.edu/~govinn/rdg.html>
- Research work consists of building synthetic characters that rely on a host of AI and learning systems. See the flier at http://www.cs.rpi.edu/~govinn/Cogito_under_the_hood.pdf for an overview of the latest incarnation of one such character, Cogito, handled by Naveen at the RAIR Lab.
- Co-instructor for the course *Minds, Machines and Gödel*, Fall 2012
- Guest lecturer for the course *Introduction to Logic* in Fall 2011, Spring 2012 and Spring 2013.

- Co-instructor for the course *Computational Learning Theory and Science*, Fall 2010.
- Helped the PI (Prof. Bringsjord) in writing the winning Templeton Foundation proposal titled “Toward a Markedly Better Geography of Minds, Machines, and Math.”
- Met and interfaced with teams from industrial research labs. These include discussions with the Watson/DeepQA team from IBM, the team that won the man-versus-machine Jeopardy contest in 2011, on extending DeepQA into medical domains, and an interaction with a vice-presidential team from Disney Imagineering.

HP Labs India

Consultant, Biometrics and Handwriting Recognition

June 2006 - June 2008
(Intern in the first year)

- Worked on cancelable biometrics.
- Contributed to LipiTk (Dynamic Time Warping and other modules) <http://lipitk.sourceforge.net/>.
- Built a password manager based on doodles.

Tata Institute of Fundamental Research (TIFR), Mumbai

Visiting Student Research Program

May 2004 - July 2004

- Studied laser cooling of atoms. Developed a theoretical model for the decay of an atom cloud in an magneto-optical trap and verified it experimentally.
- Was preselected for TIFR’s prestigious Ph.D. program in Physics.

Indian Space Research Organization

Intern, Mission Control Facility

May - July 2003

- Studied various processes and sub systems of geo-synchronous satellites.
- Built a prototype fingerprint recognition system.

JOURNAL PUBLICATIONS

1. Selmer Bringsjord and Naveen Sundar Govindarajulu. “Toward a Modern Geography of Minds, Machines, and Math.” To appear in Müller, Vincent C. (ed.), (forthcoming 2012), *Special Issue on the Theory and Philosophy of Artificial Intelligence (SAPERE)*, Berlin: Springer).
2. Selmer Bringsjord and Naveen Sundar Govindarajulu. “Given the Web, What is Intelligence Really?” *Metaphilosophy Special Issue, Philoweb: Toward a Philosophy of the Web* 43.4 2012: 361–532. Print.
Preprint available at
http://kryten.mm.rpi.edu/SB_NSQ_Real_Intelligence_040912.pdf
3. Naveen Sundar Govindarajulu and Selmer Bringsjord. “The Myth of ‘The Myth of Hypercomputation.’” *Parallel Processing Letters* 22.3 2012: 14 pages. Print.
Offprint available at
http://kryten.mm.rpi.edu/Univ_Turku_The_Myth_Of_The_Myth.pdf
4. Selmer Bringsjord, Naveen Sundar Govindarajulu, Eugene Eberbach and Yingrui Yang. “Might the Rigorous Modeling of Economic Phenomena Require Hypercomputation?” *International Journal Of Unconventional Computation* 8.1 2012: 3–32. Print.
Preprint available at
http://kryten.mm.rpi.edu/SB_NSQ_EE_YY_28-9-2010.pdf
5. Selmer Bringsjord and Naveen Sundar Govindarajulu. “In Defense of the Unprovability of the Church-Turing Thesis.” *International Journal of Unconventional Computing* 6 2011: 353–373. Print.
Preprint available at
<http://www.cs.rpi.edu/~govinn/papers/uc2009.pdf>

ABSTRACTS, CONFERENCE & WORKSHOP PROCEEDINGS

1. John Licato, Naveen Sundar Govindarajulu, Selmer Bringsjord, Michael Pomeranz and Logan Gittelson, Analogico-Deductive Generation of Gödel’s First Incompleteness Theorem from the Liar Paradox, to appear in the *Proceedings of the International Joint Conference of Artificial Intelligence, 2013 (IJCAI 2013)*, Beijing).
2. Naveen Sundar Govindarajulu & Selmer Bringsjord, Proving Theorems using Uncomputable Games: Examples from Physics, in *Colloquium Logicum 2012*, September 2012, Paderborn, Germany.

3. Naveen Sundar Govindarajulu, Selmer Bringsjord & Joshua Taylor, Proof verification and Proof Discovery for Relativity, in *Proceedings of the First International Conference on Logic and Relativity 2012*, (forthcoming). September 2012, Budapest, Hungary. Preprint available here:
https://s3.amazonaws.com/PAPERS/pv_and_pd_for_relativity.pdf.
4. Naveen Sundar Govindarajulu, Uncomputable Games: Toward Crowd-sourced Solving of Truly Difficult Problems, *Turing Centenary Conference CiE 2012 Abstracts Booklet*, June 2012, Cambridge UK. Available at:
<http://www.mathcomp.leeds.ac.uk/turing2012/WScie12/Images/abstracts-booklet.pdf>
5. Naveen Sundar Govindarajulu and Selmer Bringsjord, Logic-Based Simulations of Mirror Testing for Self-Consciousness, in *Proceedings of the First International Conference of IACAP Celebrating 25 years of Computing and Philosophy (CAP) conferences: "The Computational Turn: Past, Presents, Futures?"*, 2011, Aarhus Denmark.
6. Naveen Sundar Govindarajulu, Toward a Logic-based Analysis and Simulation of the Mirror Test, *Proceedings of the European Agent Systems Summer School Student Session*, Girona, Spain, July 2011. Available at:
<http://eia.udg.edu/easss2011/resources/docs/paper5.pdf>
7. Naveen Sundar Govindarajulu and Selmer Bringsjord. The Myth of the 'Myth of Hypercomputation, in *Proceedings of the Satellite Workshops of UC 2011* (M. Stannet, D. Makowiec, A. Lawniczak, and B. D. Stefano, eds.), Turku Center for Computer Science, Turku, Finland, 2011. ISBN 978-952-12-2602-1, ISSN 1797-8831.
8. Selmer Bringsjord, Joe Johnson, and Naveen Sundar Govindarajulu, Hypercomputation, Artificial Intelligence, and the Future of Economics, *Proceedings of the Satellite Workshops of UC 2011* (M. Stannet, D. Makowiec, A. Lawniczak, and B. D. Stefano, eds.), pp. 2135, Turku Center for Computer Science, Turku, Finland, 2011. ISBN 978-952-12-2602-1, ISSN 1797-8831.
9. Selmer Bringsjord and Naveen Sundar Govindarajulu, In Further Defense of the Unprovability of the Church-Turing Thesis, *Studia Logica Conference on Trends in Logic IX: Church's Thesis: Logic, Mind and Nature*, June 2011, Krakow, Poland.
10. Naveen Sundar Govindarajulu and Sriganesh Madhvanath, Password Management using Doodles, *Proceedings of the 9th International Conference on Multimodal Interfaces*, November 12-15, 2007, Nagoya, Aichi, Japan.

TALKS PRESENTED

- Selmer Bringsjord & Naveen Sundar Govindarajulu. *To Infinity and Beyond! Our Mission: To Boldly Go Where No Machine Has Gone, or Ever Will*.
 - Abstract available at http://kryten.mm.rpi.edu/PRES/INFINITYEMPAC/SB_NSQ_To_Infinity_at_EMPAC_abstract.pdf
 - Slides available in pdf at http://kryten.mm.rpi.edu/PRES/INFINITYEMPAC/SB_NSQ_EMPAC_Infinity.pdf
 - Slides available in source Keynote at http://kryten.mm.rpi.edu/PRES/INFINITYEMPAC/SB_NSQ_EMPAC_Infinity.key
- Selmer Bringsjord & Naveen Sundar Govindarajulu, Simon Ellis, Joe Johnson, Alexander Haig & Alexander Bringsjord, *Logic-Based Modeling and Simulation of Human-Level Cognition: Methodology Encapsulated, and Four Examples*. Naval Postgraduate School, July 30 2012. Presentation files (minus demonstration videos) available at http://kryten.mm.rpi.edu/PRES/NPGS_073012/SB_NSQ_SE_JJ_AH_AB_NPGS_073012_short.pdf
- Naveen Sundar Govindarajulu, *Toward a Logic-based Analysis and Simulation of the Mirror Test* at the European Agent Systems Summer School Student Session, July 2011, Girona, Spain.
- Selmer Bringsjord and Naveen Sundar Govindarajulu, Project Presentation at the Templeton Foundation Workshop *Foundational Questions in the Mathematical Sciences*, July 2011, Traunkirchen, Austria.
- Naveen Sundar Govindarajulu and Selmer Bringsjord, *Logic-Based Simulations of Mirror Testing for Self-Consciousness*, at the First International Conference of IACAP Celebrating 25 years of Computing and Philosophy (CAP) conferences: "The Computational Turn: Past, Presents, Futures?," 2011, Aarhus Denmark.
- Selmer Bringsjord, Eugene Eberbach, Naveen Sundar Govindarajulu and Yingrui Yang, *Might the Rigorous Modeling of Economic Phenomena Require Hypercomputation?* at HyperNet-10 in Unconventional Computing 2010, June 21-25, 2010 Tokyo, Japan. .

- Selmer Bringsjord and Naveen Sundar Govindarajulu, *In Defense of the Unprovability of the Church-Turing Thesis* at the Hypercomputation Workshop in Unconventional Computing 2009, September 9, 2009, Azores, Portugal.

PATENTS

- Method and Computer Program Product for Generating Shortcuts for Launching Computer Program Functionality on a Computer, US Pat. App 12351595 (Pending).
- Authentication System and Method, US Pat. App 12030216. (Pending).

SUNDRY

- Organized the workshop “*Toward a Serious Computational Science of Intelligence*” at Artificial General Intelligence-2010 with primary organizer Bringsjord.

http://kryten.mm.rpi.edu/WORKSHOPS/AGI10/SB_NSQ_AGI10wshop.pdf

- Mentions in the press
 - Participated in an event marking the release of IBM’s Watson system to RPI. RPI is the first university to receive the Watson system from IBM.
 - * <http://www.timesunion.com/business/article/Watson-offers-edge-in-Big-Data-4237415.php#photo-4112118>
 - * http://www.washingtonpost.com/blogs/innovations/post/ibms-watson-goes-to-school-a-qanda-with-rpis-jim-hendler/2013/01/31/b6bc62b4-6bcb-11e2-ada0-5ca5fa7ebe79_blog.html
 - * Video: <http://www.pcmag.com/article2/0,2817,2414914,00.asp>
 - * Video: <http://www.theverge.com/2013/1/30/3933716/rpi-first-university-to-receive-ibm-watson-system>
 - Recently mentioned in China’s largest English newspaper: http://www.chinadaily.com.cn/opinion/2011-06/17/content_12719877.htm.
 - Apogee 2004 Coordinator for Physics. (Apogee is an all India Tech festival conducted annually at BITS-Pilani.) Organized a workshop on Electro-optics, which received more than 100 participants and found a mention in India’s leading English newspaper *The Hindu*. Also conducted 3 more events and supervised 15 student projects.
- Common Lisp Actors: An actor calculus based concurrent system for Common Lisp. Now available in the QuickLisp set of libraries as `cl-actors`. One example use can be found in an IRC bot (see <https://bitbucket.org/naryl/xpickbot/>) for the 3D game Xonotic. Also see <http://github.com/naveensundarg/Common-Lisp-Actors>.
- Computing Skills
 - Programming Languages: Scheme, Common Lisp, Java, Prolog, MATLAB, Objective C, Php.
 - Frameworks & Libraries: Blender (3D graphics and game engine), iOS GLKit, OpenGL ES, OpenCV (computer vision), SNARK (automated theorem prover), Sesame (RDF processing framework).
- Scores: GRE:1590/1600, Analytical: 5/6, Verbal: 790, Quant: 800 (August, 2007) and TOEFL: 111/120 (July, 2007).