Venkatesh Choppella

Ph. D.

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Objective

Software Systems Engineering: Research, Development and Teaching.

Expertise

Software Engineering, Development and Supervision of large Software Systems, Formal Verification, Theorem Proving, Compilers, Web Security, Accessibility and Educational Technology. Full-stack development.

Academic Research and Teaching, Supervision of PhD and Masters students. Design, Development and Delivery of courses in computer science and engineering.

Education

2002	**Indiana University**, *Bloomington, IN United States*, Doctor of Philosophy, Computer Science. Dissertation title: "Unification source-tracking with application to the diagnosis of type inference"
1987	**Indian Institute of Technology**, *Madras, India*, Masters of Technology, Computer Science and Engineering. Dissertation title: "Implementation of ML using the SECD machine"
1985	**Indian Institute of Technology**, *Kanpur, India*, Bachelors of Technology, Computer Science and Engineering.

Work

Teaching

present–2009	**Associate Professor**, *IIIT*, Hyderabad.
	Teaching undergraduate and graduate courses in Computer Science and Software Engineering: Principles of Programming Languages, Semantics of Programming Languages, Software Foundations, Automata Theory, Program Verification, Advanced Problem Solving, Information Technology Workshop.
2010–2009	**Visiting Associate Professor**, *IIIT*, Bengaluru.
	Teaching graduate level courses in Programming Language Models, Application Programming
2008–2003	**Associate Professor**, *IIITMK*, Trivandrum.
	Teaching graduate level courses in computer science and information technology: Web Technology, Data Bases, Data Structures, Principles of Programming, Mathematical Foundations of Information Technology, Bio-informatics

Research

2005–2006	**Visiting Research Scientist**, *Ohio State University*, Columbus, Ohio, USA.
	Research on compilers for high-performance computing. The Tensor Contraction Engine. Several papers published as result of research
2003–2002	**Post-doctoral Scientist**, *Oak Ridge National Labs*, Oak Ridge, Tennessee, USA.
	Research on compilers for high-performance computing. The Tensor Contraction Engine. Several papers published during this time
1999–1997	**Member, Research Staff**, *Xerox PARC*, Palo Alto, California.
	Research on Aspect-Oriented Programming. Implementation of the early releases of AspectJ. Work on Aspects for Tracing and Monitoring patented[2]

Industry

Jan 2001 - Aug 2001	**R&D Engineer**, *Hewlett-Packard Systems*, Cupertino, California.
	Engineering and Development of E-speak, a web-services based open source product. See W3C tech report [3] .
1997–1995	**R&D Engineer**, *Derivation Systems*, Carlsbad, California.
	Building a hardware compiler in the Scheme programming language and verifying compiler transformations in the PVS interactive theorem prover for NASA Langley. Part of the work reported in FMCAD 1996[1]

1988–1987	**R&D Engineer**, *Computer Maintenance Corporation*, Secunderabad, India. Building a compiler VECTRAN, a high performance programming language.

Active Academic Collaborations

2018-present	**University of Buffalo**, *Prof. Bharat Jayaraman.*

Industrial Consultancy and Collaboration

2018-2019	**TCS Innovation Labs**, *Pune, India*, Building Control System Software.
2019–2020	**Consultant**, *Siemens, India*, Bengaluru, India. Model Checking Algorithms
2006–2004	**Consultant**, *Tata Consultancy Services*, Trivandrum, India. Teaching and Training in Java and Web technologies.
2008–2007	**Consultant**, *Cognizant Technology*, Chennai, India. Teaching and Training in Programming Principles.
2008	**Consultant**, *Satyam Computers*, Hyderabad, India. Teaching and Training in Programming Principles.

Academic Supervision

Current PhD students	1. Sai Gollapudi: "Semantic Style Sheets for Web Accessibility" 2. Mrityunjay Kumar: "Model Driven Approach to generation of Virtual Labs" 3. Amar Banerjee: "Knowlege-centered development and engineering of control system software"
Current MS students	1. Soumya M. Saraswathi: "Ontology Services for Web Accessibility" 2. Arjun Sanjeev: "Modular control of Concurrent Processes" 3. Krutam Hathi: "Analytics for Virtual Labs"

MS theses
Supervised

1. **Scalable Distributed Safety Verification using Actor Architecture**. Adhish Singla. (Main supervisor: Suresh Purini). IIIT Hyderabad. Dec 2019.
2. **Application, Modelling and Implementation of CORP**. Akash Agrawall. IIIT Hyderabad. Apr 2018.
3. **Mitigating Web-borne Security Threats by Enhancing Browser Security Policies**. Krisha Chaitanya Telikicherla. IIIT Hyderabad. May 2016.
4. **Specification and Modelling of Workflow Management Systems with State Based Access Control**. Ankur Goel. IIIT Hyderabad. Apr 2016.
5. **Evolution of Mental Models of Interactive Machines: A Formal Approach** Himanshu Zade. IIIT Hyderabad. Apr 2015.
6. **Automata based abstraction of interval assumptions and bounded input linear systems for verification and controller synthesis**. Santosh Arvind Adimoolam. (Co-superivor: Viswanath Kasturi). IIIT Hyderabad Sep 2014.
7. **Exploring Crowdsourcing to Personalize Web Experiences**. Deepti Agrawal. (Main supervisor: Vasudeva Varma). IIIT Hyderabad. Nov 2013.

Professional Service

Programme
Committee
membership

○ COMPUTE 2020, ISEC 2019 (Tutorials and Tech Briefings co-chair), 3rd Indian SAT+SMT School 2018 (Organizing committee), ICDCIT 2019, LATicE 2020, 2018, 2015, FORMABS 2016. T4E 2018, 2016 (Publicity Chair), 2015 (PC Chair), 2014, 2013, 2012, 2011. ICTEE 2012, CSEE&T 2012, 2011. ICDCIT 2018, 2012. ISEC 2011. ICEGOV 2015, 2014, 2013, 2012, 2011, 2010. WAMBSE 2012, 2011. Free S/W Free Society 2005. ADCOMM 2005. PDCAT 2004.

Journal reviewer

○ Formal Methods in System Design. Springer, 2010. Journal of Parallel and Distributed Computing, Elsevier, 2008. International Journal of Formal Computing, Springer 2008.

MS and PhD Examination committees	○ External thesis examiner: IIT Bombay, Amrita University, Univ of Hyderabad and Univ. of Behrampur, India. ○ Internal MS and PhD thesis examiner for more than a dozen theses at IIIT Hyderabad.
Expert Committee Member	○ **IIT Madras Digital Skills Academy** 2018. ○ **Project on Formal Methods for Testing S/W**. Defence Research and Development Organization (DRDO) Govt. of India. Research Centre Imarat (RCI). Hyderabad 2016. ○ **Digital Library Project for Kerala State**: Ministry of Electronics and Information Technolgy (Meity), Govt. of India. 2017.

Workshops, Tutorials and Talks

Workshops and Tutorials	○ Literate Programming and Version control. 3 day workshop at Defence Research and Development Organization (DRDO) Govt. of India. Research Centre Imarat (RCI), Hyderabad. July 2017.
	○ Virtual Labs on College Cloud: 3 day workshop at Jaypee University of Information Technology, Himachal Pradesh. May 2017.
	○ **Dynamical Systems, Automata and Functional Programming**: 2 day short course at Goa University Academic Staff College (ASC) for college teachers. Jan 2014.
	○ **Mapcode and Computer Problem Solving**: 3 day short course for College Teachers at VNR Vignan Jyothi College, Hyderabad. May 2013, Hyderabad. (With Prof. KV Nori and Prof. K Viswanath).
	○ **Principles of Programming for Web 2.0**: 2 week Summer School at IIIT Hyderabad for college teachers. May 3rd–14th 2010. IIIT Hyderabad. With T B Dinesh.
	○ **Practical Program Verification** 4 day short course under the Tata Excellence in Computer Science (TECS) Programme, TCS Hyderabad, February, 2008. (Session on Day 1 on "Verification in the PVS theorem prover".)
	○ One-day tutorial on Aspect-Oriented Programming and JML. *IEEE Kerala Frontiers in Computing Practice Series, Trivandrum, India. July 26th, 2006.* With Satish Babu.
	○ **Introduction to Aspect-Oriented Design and Programming** *Thirteenth International Conference on Advanced Computing and Communications, Coimbatore, India, Dec 14th, 2005.* With Anurag Mendhekar.

Grants and Awards

Grants

- **Virtual Labs Phases II and III**: (co-PI) Dec 2014-Mar 2020. Sponsor: Govt. of India. Consortium partners: IITs at Bombay Delhi, Guwahati Kanpur, Kharagpur, Roorkee, Amrita University, COE Pune, Dayalbagh University, NIT Surathkal. Total Budget: INR 85 Crores (12 Million USD).
- **State variable approach to the model-driven development of software for reactive systems**: (PI) 2011-2013. Sponsor: Siemens India, Bangalore. Budget: INR 14 Lakhs (20 000 USD)
- **Distributed Model Checking**: (Co-PI) 2014-2016. Sponsor: Hitachi India Limited. Budget: INR 15 Lakhs (approx 21 000 USD)
- **Virtual Labs Phase I**: 2010-2014. Virtual Labs Platform Engineering under the Virtual Labs Main Phase project. Budget: INR 3.3 Cr (approx 500 000 USD)
- **European Commission Erasmus Mundus External Cooperation Window**: European Research and Educational Collaboration with Asia Project for Academic Mobility 2008-2009. Co-investigator and Institute Coordinator for IIITMK. Budget: 10 000 Euro.
- **Information Security Education and Awareness (ISEA)**: Ministry of Information Technology, Government of India. 2006-2009. Co-investigator and Coordinator at Participating Institution IIITM-K. Budget: INR 36 Lakh (24 000 USD). Co-investigator.
- **Government of Kerala Police Portal for Community Interaction 2004-2005.** Budget INR 2.9L (5 000 USD). Co-investigator.

Awards

- **Springer Best Paper award: 2nd Prize**. Arjun Sanjeev and Venkatesh Choppella and Viswanath Kasturi. Peterson's Mutual Exclusion Algorithm as Feedback Control. 2nd Symposium on Application of Formal Methods for Safety and Security of Safety Critical Systems (AFMSS 2018).[7].
- **Microsoft accessibility challenge: Delegates award**. T B Dinesh, Venkatesh Choppella. Alipi – tools for a Re-narration Web. 9th International Cross-Disciplinary Conference on Web Accessibility, April 2012, Lyon, France[6].
- **All India Manthan Awards**: Second Prize in the E-Governance category. Trivandrum City Police Portal for Community Interaction www.tvmcitypolice.org, New Delhi, India, 2005.
- **Best Paper Award** International Parallel and Distributed Processing Symposium (IPDPS), Albuquerque, New Mexico, USA, 2004 [5].
- **Best Paper Award (Systems)**. Internationl Conference on High Performance Computing (HiPC), Hyderabad, India, 2003.[4].
- **DuPont Fellowship** Computer Science Dept., Indiana University, 1988.
- **Merit Certificate for performance in the Joint Entrance Examination**, IIT Kanpur, 1981.

Languages

English	**fluent**	*oral and written*
Hindi	**fluent**	*oral and written*
Telugu	**fluent**	*mother tongue*

Computer Knowledge

Over the years, I have worked with many programming languages: Imperative (C), functional languages (Racket, some Haskell and ML), object oriented languages (Java, Python, Javascript), also theorem provers (PVS). I use Git, Emacs-Lisp and Org-mode and Python extensively for getting things done.

References

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Available upon request.

Publications

Refereed Conference Posters

[3] Mrityunjay Kumar, Jessica Emory, and Venkatesh Choppella. "Usability Analysis of Virtual Labs". In: ACM-India Compute. (Goa, India). Poster. ACM India. Oct. 2019.

[2] Swaminathan Natarajan, Kesav Vithal Nori, Viswanath Kasturi, Anand Kumar, Venkatesh Choppella, and Subhrojyoti Roy Chaudhuri. "A Conceptual Model of Systems Engineering". In: *28th Annual INCOSE International Symposium.* July 2019.

[1] Venkatesh Choppella and Amulya Pulijala. "Visual Modeling of Javascript". In: *Modeling Symposium.* 8th India Software Engineering Conference. Poster. Feb. 2015.

Refereed Conference and Workshop papers

[62] Venkatesh Choppella, Arjun Sanjeev, Kasturi Viswanath, and Bharat Jayaraman. "Generalised Dining Philosophers as Feedback Control". In: *International Conference on Distributed Computing and Internet Technology (ICDCIT).* Ed. by D. V. Hung and M. D'Souza. LNCS 11969. Springer, 2020, pp. 144–164. DOI: https://doi.org/10.1007/978-3-030-36987-3_9.

[61] M. Kumar, V. Choppella, S. Sunil, and S. Syed. "A Learnable-by-Design (LEAD) Model for Designing Experiments for Computer Science Labs". In: *2019 IEEE Tenth International Conference on Technology for Education (T4E).* 2019, pp. 222–229.

[60] R. S. Pillutla, V. Choppella, L. M. S, M. Dammaraju, and P. Raman. "Enhancing Virtual Labs Usage in Colleges". In: *2019 IEEE Tenth International Conference on Technology for Education (T4E).* 2019, pp. 158–161.

[59] R. S. Pillutla, L. M. S, V. Choppella, A. Jesrani, P. Raman, and Y. Raghu Reddy. "Towards Massively Open Online Virtual Internships in Computing Education". In: *2019 IEEE Tenth International Conference on Technology for Education (T4E).* 2019, pp. 90–93.

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[57]   Gollapudi VRJ Sai Prasad, Sridhar Chimalakonda, and Venkatesh Choppella. "Towards a Domain-Specific Language for the Renarration of Web Pages". In: *Proceedings of the 11th Innovations in Software Engineering Conference*. ISEC '18. Hyderabad, India: ACM, 2018, 3:1–3:10. ISBN: 978-1-4503-6398-3. DOI: 10.1145/3172871.3172873. URL: http://doi.acm.org/10.1145/3172871.3172873.

[56]   Arjun Sanjeev, Venkatesh Choppella, and Viswanath Kasturi. "Peterson's Mutual Exclusion Algorithm as Feedback Control". In: *2nd Symposium on Application of Formal Methods for Safety and Security of Safety Critical Systems (AFMSS 2018)*. **Best Paper Award: 2nd Prize**. Springer, 2018.

[55]   Mrityunjay Kumar, Jessica Emory, and Venkatesh Choppella. "Usability Analysis of Virtual Labs". In: *2018 IEEE 18th International Conference on Advanced Learning Technologies (ICALT)*. IEEE, July 2018, pp. 238–240. DOI: 10.1109/ICALT.2018.00061.

[54]   Shovan Swain, Lalit Sanagavarapu, Venkatesh Choppella, and Y. Raghu Reddy. "Model Driven Approach for Virtual Lab Authoring - Chemical Sciences Labs". In: *International Conference on Advanced Learning Technologies (ICALT)*. Accepted for publication. IEEE, July 2018.

[52]   Gollapudi VRJ Sai Prasad, Venkatesh Choppella, and Sridhar Chimalakonda. "A Style Sheets Based Approach for Semantic Transformation of Web Pages". In: *Distributed Computing and Internet Technology 14th International Conference, ICDCIT 2018, Proceedings*. Vol. 10722. LNCS. Bhubaneshwar, India: Springer, Jan. 2018, pp. 240–255.

[51]   Akash Agrawall, Shubh Maheshwari, Projit Bandyopadhyay, and Venkatesh Choppella. "Modelling and Mitigation of Cross-Origin Request Attacks on Federated Identity Management Using Cross Origin Request Policy". In: *Information Systems Security: 13th International Conference, ICISS 2017, Mumbai, India, December 16-20, 2017, Proceedings*. Springer, 2017, pp. 263–282. ISBN: 978-3-319-72598-7. DOI: 10.1007/978-3-319-72598-7_16. URL: https://doi.org/10.1007/978-3-319-72598-7_16.

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[42] A. Singla, K. Desai, S. Purini, and V. Choppella. "Distributed Safety Verification Using Vertex Centric Programming Model". In: *2016 15th International Symposium on Parallel and Distributed Computing (ISPDC)*. July 2016, pp. 114–120. DOI: 10.1109/ISPDC.2016.23.

[41] V. Choppella, G. Ahuja, and A. Mavalankar. "How Does a Program Run? A Visual Model Based on Annotating Abstract Syntax Trees". In: *2016 International Conference on Learning and Teaching in Computing and Engineering (LaTICE)*. Mar. 2016, pp. 38–42. DOI: 10.1109/LaTiCE.2016.40.

[40] Aditi Mavalankar, Tejaswinee Kelkar, and Venkatesh Choppella. "Generation of Quizzes and Solutions Based on Ontologies – A Case for a Music Problem Generator". In: *2015 IEEE Seventh International Conference on Technology for Education (T4E)*. IEEE, Dec. 2015, pp. 73–76. DOI: 10.1109/T4E.2015.16.

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[38] Tejaswinee Kelkar, Anon Ray, and Venkatesh Choppella. "SangeetKosh: An Open Web Platform for Hindustani Music Education". In: *Proceedings of the 15 IEEE Conference on Advances in Learning Technologies*. ICALT 2015. Hualien, Taiwan: IEEE, July 2015, pp. 5–9.

[37] Gollapudi VRJ Sai Prasad, T. B. Dinesh, and Venkatesh Choppella. "Overcoming the New Accessibility Challenges Using the Sweet Framework". In: *Proceedings of the 11th Web for All Conference*. W4A '14. Seoul, Korea: ACM, 2014, 22:1–22:4. ISBN: 978-1-4503-2651-3. DOI: 10.1145/2596695.2596711. URL: http://doi.acm.org/10.1145/2596695.2596711.

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Recent Talks

[17] *Virtual Labs Development Tools.* **Invited Talk** at Webinar on Virtual Labs. APJ Abdul Kalam Technical University, Lucknow, Apr. 22, 2020.

[16] *The Tension between Interaction and Automation.* **Invited Talk** at the 2nd Workshop on Software Engineering for an Uncertain World. Colocated with ACM Innovations in Software Engineering, 2020. Jabalpur, India, Feb. 27, 2020.

[15] *Virtual Labs for Science and Engineering.* **Invited Talk** at the 3rd Workshop on Emerging Software Engineering Education. Colocated with ACM Innovations in Software Engineering, 2020. Jabalpur, India, Feb. 27, 2020.

[14] *Model Checking with the IC3 Algorithm: An introduction.* Talk given to at Siemens Corporate Technology Centre, Begaluru. Bengaluru, India, Feb. 7, 2020.

[13] *Internet of Things: Challenges and opportunities from a distributed computing viewpoint.* 16th International Conference on Distributed Computing and Internet Technology (ICDCIT). Panelist. Bhubaneshwar, India, Jan. 10, 2020.

[12] *Algodynamics Approach to Teaching Algorithms.* Faculty Development Programme. 1-day Workshop. Hyderabad, India: IEEE, Nov. 9, 2019.

[11] *Literate Programming in Emacs Org mode.* Geeknights talk at Thoughtworks, Hyderabad. Nov. 8, 2019.

[10] *Feedback Control Approach to Concurrency.* Prof. Rajaram Memorial Lecture Series. **Invited Talk** at Computer Science and Engineering Department, Manipal Institute of Technology. Manipal, India, July 24, 2019.

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[8]   *Literate Programming.* RMLL 2018, University of Strasbourg, France. July 8, 2018.

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