

# Sridhar Chimalakonda

## Curriculum Vitae

Guest Faculty, **IIT Tirupati, India**  
Visiting Faculty, **IIT Sri City, India**  
Chief Research Advisor, **FortunaPIX, India**  
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### ———— Distinguished Highlights

- 2017 Vice Chair, *Social Media & Global Outreach*, **ACM SIGSOFT**, ACM Special Interest Group on Software Engineering
- 2017 Associate Editor, *Software Quality & Software Reuse*, **IEEE Software Blog**
- 2017 Core Committee, **ACM iSIGCSE**, Special Interest Group on Computer Science Education  
*Empirical research on the state-of-the-art of computing education in India*
- 2015 onwards Visiting/Guest Faculty for last two years of PhD - **Some experiments in teaching** - 24 hour exam, teaching through seminal and state-of-the-art papers, co-writing a book with students
- 2009 onwards Domain Expert, Seventh Sectional Committee (SC7) of Joint Technical Committee (JTC1) of the International Organization for Standardization (ISO) - **Software & Systems Engineering** \* SC36 - **Information Technology for Learning, Education and Training**
- 2009 onwards Co-Editor for two international Software Product Lines standards [ISO/IEC 26551, ISO/IEC 26555] and three work-in-progress draft standards [ISO/IEC 26552, 26553, 26554]
- 2016 *Computing Research for Society* - Our work on design of educational technologies for adult literacy transferred to *National Literacy Mission Authority, India* \* <http://rice.iiit.ac.in>
- 2010-2016 Six international [ICSE 2012, 2013, 2014 & ICALT 2012, 2013, 2014] and 20+ national travel grants by Microsoft Research, TCS and ACM SIGSOFT \* student volunteer at most places
- 2011 Special Invitee [while being a Research Scholar], Steering Committee, Education, Planning Commission of India, now **NITI AYOJ, Government of India**
- 2010-2015 TCS Research Fellowship \* I have received merit-based scholarship throughout my education

### ———— Research Interests \* Interdisciplinary Research

**Software Engineering** → Empirical Software Engineering, Software Quality & Software Reuse, Patterns, Software Product Lines, Software Architecture, Requirements Engineering  
**Educational Technologies** → Quality, Scale & Variety in Instructional Design, Ontologies, Gamification, Personalized Learning, Virtual & Augmented Reality for Story Telling and Labs  
*Human Computer Interaction for Usability of Government and Mobile Apps, ICT for Development*

### ———— Education

- Feb 2017 **PhD in Computer Science & Engineering**  
*International Institute of Information Technology - Hyderabad, India*
- Title **A Software Engineering Approach for Design of Educational Technologies**  
Advisor: Prof. Kesav V. Nori
- Challenge *How to facilitate the design and customization of software systems [educational technologies] for scale & variety? [287 million learners, 22 Indian Languages, varied instructional designs]*
- An Approach This thesis explored the idea of applying software engineering concepts such as *patterns* → *ontologies* → *software product lines* for design of a large scale and variety of software systems in education domain. Specifically, we demonstrated that eLearning Systems for adult literacy in India can be developed in around 2 person-weeks from previous best of 6 person-months.

- Impact 2 International Standards, 3 work-in-progress standards, 15+ publications, open source software at <http://rice.iiit.ac.in>, mobile version on Google Play Store <http://bit.ly/2fLHjhd>, and officially listed in Govt. of Telangana websites <http://tslma.nic.in> \* <http://srctelangana.com>. Considering the need to design thousands of eLearning Systems at all levels of education catering to hundreds of subjects using varied instructional designs delivered in multiple languages, our approach can lead to significant impact.
- March 2010 **MS by Research in Computer Science & Engineering**  
*International Institute of Information Technology - Hyderabad, India*
- Title **Towards Automating the Development of a family of eLearning Systems**  
Advisor: Prof. Kesav V. Nori
- Impact 10-fold productivity [development effort for eLearning Systems reduced from 5 to 6 person-years to 5 to 6 person-months]
- June 2005 **B.Tech in Computer Science & Engineering \* Grade - 80.3%**  
*JNTU - Hyderabad, India*
- Title **Next-Gen System Startup Software with Intel**
- Innovation Early contributions to *tianocore*, a powerful pre-boot interface which eventually led to Unified Extensible Firmware Interface, that is commonplace today \* My main goal for this project was to deliver *software for rent* aka cloud computing in today's terminology
- May 2001 **12th Standard \* 92.3%**  
Govt. College, Board of Intermediate Education, Andhra Pradesh, India
- April 1999 **10th Standard \* 85.6%**  
Govt. School, Board of Secondary Education, Andhra Pradesh, India

## Experience

### Academic Experience

- Jan 2017 - **Guest Faculty, IIT Tirupati, India**  
Present *Paradigms of Programming*, Spring 2017  
 ➤ A work-in-progress book titled *The Lasting Contributions of Computing - Past, Present & Future* is an attempt to summarize ACM Turing Award lectures on programming languages  
 ➤ Empirical studies on different aspects of programming languages
- August 2015 - **Visiting Faculty, IIIT Sri City, India**  
Present 🏆 *Software Engineering [Foundations & Practice]* - Monsoon 2015, Monsoon 2016  
*Programming Languages [Foundations & Practice]* - Spring 2016, Spring 2017  
 ➤ *ACM Game Hackers 2016*, Conducted a hackathon instead of a mid-exam in software engineering course with 120 students on the theme of games for computing education
- April 2011 - **Guest Instructor/Teaching Assistant, IIIT Hyderabad, India**  
Sep 2016 Courses in Software Engineering, Principles of Programming Languages, Process Engineering
- Industry/Research Experience
- April 2011 - **Research Intern, TCS Innovation Labs, India**  
Sept 2011, ➤ Developed a platform called ALP Factory to re-engineer and customize existing eLearning Systems for 9 Indian Languages. We used this platform and reduced development effort from  
 Nov 2007 - 6 person-years to 6 person-months and empirically evaluated on the field  
 May 2009
- July 2006 - **Software Engineer (R&D), Canarys Automations Pvt. Ltd., India**  
July 2007 Rapid prototyping of research ideas in the areas of Software Reuse, Component Factory [Extract, Transform, Load], Architecture and Re-engineering
- May 2005 - **Software Consultant, The Lighthouse Consulting Pvt. Ltd., India**  
June 2006 Developed a product for performance appraisal in management consulting

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## Research Agenda

- Core Principles** ➤ Promote undergrad research [not at the cost of fundamentals]
- Principles** ➤ Start in Sem III, groom and conduct research from Sem IV onwards. Two modes:
- ✳ *Research-driven* [Great Research + Good Development] ✳ research papers + some tools
  - ✳ *Development-driven* [Great Development + Good Research] ✳ frameworks + some papers
- Research Goals** ➤ Analyze millions of software repositories qualitatively and quantitatively to assess qualities [such as correctness, security, reliability, usability and so on] of a diversified range of software artifacts [such as code, bugs, logs, tests, patterns, designs and so on]
- How to instrument software with virtual agents and assistants that can continuously and automatically adapt the software as per evolving requirements?
  - How to support millions of software developers and testers to write quality software?
  - Provide personalized life long learning for 7.1 billion learners

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## Research Contributions to International Standards

**Co-Editor** Two international standards and three in-progress drafts in SC7- Software and Systems Engineering driven by the idea of patterns for software product lines from PhD thesis

2009 - 2016 ISO/IEC 26551:2016, *Tools and methods for product line requirements engineering*, Published as International Standard

2015 onwards ISO/IEC 26552, *Tools and methods for product line architecture design*, Working Draft

2012 onwards ISO/IEC 26553, *Tools and methods for product line realization*, Community Draft

2012 onwards ISO/IEC 26554, *Tools and methods for product line verification and validation*, Community Draft

2009 - 2016 ISO/IEC 26555:2016, *Tools and methods for product line technical management*, Published as International Standard

2016 Proposed International Standard for ISO/IEC SC36, *A Reference Model for Design of Educational Technologies - Quality, Scale and Variety*

🏆 Official appreciation from ISO and Bureau of Indian Standards (BIS) is available at <http://bit.ly/2mJAjaY>

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## Publications

### Journals

[J.3] **S. Chimalakonda** and K. V. Nori, "A Pattern for Modeling Instructional Process for Design of eLearning Systems - Quality, Scale and Variety," *Indian Journal of Adult Education*<sup>1</sup> Vol. 78(1) 2017, pp. 56-65.

[J.2] **S. Chimalakonda** and K. V. Nori, "A Journey of Technology Enhanced Language Learning - Quality, Scale and Variety," To Appear in the *Indian Journal of Adult Education*, 2017

[J.1] **S. Chimalakonda** and D. Lee., "On the Evolution of Software and Systems Product Line Standards"<sup>2</sup>, In *SIGSOFT Softw. Eng. Notes* 41, 3 (June 2016) DOI:<http://dx.doi.org/10.1145/2934240.2934248>

### Journals - Under review and ready for submission

[JR.1] **S. Chimalakonda** and K. V. Nori, "Learning Design Autoring Tools - A Panoramic View," Submitted to *Learning, Design, and Technology: An International Compendium of Theory, Research, Practice and Policy, Major Reference Work by Springer*<sup>3</sup> || Initial proposal accepted


[JWIP.5] **Chimalakonda, S.**, Nori, K. V., "A Software Product Line Approach for Design of eLearning Systems - Quality, Scale & Variety", To be submitted to *IEEE Transactions on Learning Technologies*

<sup>1</sup> This journal is in its 78th year of publication and running since 1939


<sup>2</sup> An extended version of this article was invited for the *Journal of Computer Standards & Interfaces*, Elsevier

<sup>3</sup> Owing to the nature of our research context, we focused more on international standards and transfer of our approach to *National Literacy Mission Authority*. I will be submitting all my journal papers from my thesis before April 2017.

- [JWIP.4] **S. Chimalakonda** and K. V. Nori, “A Patterns-Oriented Approach to facilitate Reuse in Instructional Design”, *To be submitted to Educational Technology Research and Development (ETRD, Springer)* | Extension of conference paper
- [JWIP.3] **S. Chimalakonda** and K. V. Nori, “An Ontology Based Modeling Framework for Instructional Design”, *To be submitted to Educational Technology Research and Development (ETRD, Springer)* | Extension of conference paper
- [JWIP.2] **S. Chimalakonda** and K. V. Nori,, “Design of Educational Technologies – Quality, Scale and Variety”, *To be submitted to Springer Briefs [A Monograph of 50 pages]*
- [JWIP.1] Kulkarni N, **S. Chimalakonda**, Varma V., “A Process Oriented Taxonomy for Pull Based Software Development Model”, *To be submitted to Empirical Software Engineering Journal*
- Conferences ✨ *All conference trips fully supported by merit-based scholarships*
- [C.15] G. V. Prasad, **S. Chimalakonda**, V. Choppella, and Y. R. Reddy, “An Aspect Oriented Approach for Renarrating Web Content,” In *Proceedings of the 10th Innovations In Software Engineering Conference*. ACM, 2017, pp. 56-65.
- [C.14] **S. Chimalakonda** and K. V. Nori, “A Patterns-Based Approach for Modeling Instructional Design and TEL Systems,” In *Advanced Learning Technologies (ICALT), 2014 IEEE 14th International Conference on*. IEEE, 2014, pp. 54-56.
- [C.13] K. V. Nori, Y. R. Reddy, and **S. Chimalakonda**, “Challenges for Software Engineering In Educational Technologies,” In *Contemporary Computing and Informatics (IC3I), 2014 International Conference on*. IEEE, 2014, pp. 267-272.
- [C.12] **S. Chimalakonda** and K. V. Nori, “Designing Technology for 287 Million Learners,” In *Advanced Learning Technologies (ICALT), 2013 IEEE 13th International Conference on*. IEEE, 2013, pp. 197-198.
- [C.11] **S. Chimalakonda** and K. V. Nori, “IDont: An Ontology Based Educational Modeling Framework for Instructional Design,” In *Advanced Learning Technologies (ICALT), 2013 IEEE 13th International Conference on*. IEEE, 2013, pp. 253-255.
- [C.10] **S. Chimalakonda** and K. V. Nori, “EasyAuthor: Supporting Low Computer Proficiency Teachers In the Design of Educational Content for Adult Illiterates,” In *CHI’13 Extended Abstracts on Human Factors In Computing Systems*. ACM, 2013, pp. 649-654.
- [C.9] **S. Chimalakonda** and K. V. Nori, “GURU: An Experimental Interactive Environment for Teachers/Learners,” In *Advanced Learning Technologies (ICALT), 2013 IEEE 13th International Conference on*. IEEE, 2013, pp. 248-249.
- [C.8] **S. Chimalakonda** and K. V. Nori, “What Makes It Hard To Teach Software Engineering To End Users? Some Directions from Adaptive and Personalized Learning,” In *Software Engineering Education and Training (CSEE&T), 2013 IEEE 26th Conference on*. IEEE, 2013, pp. 324-328.
- [C.7] **S. Chimalakonda** and K. V. Nori, “A Software Engineering Perspective for Accelerating Educational Technologies,” In *Advanced Learning Technologies (ICALT), 2012 IEEE 12th International Conference on*. IEEE, 2012, pp. 754-755.
- [C.6] **S. Chimalakonda** and K. V. Nori, “Towards a Synthesis of Learning Methodologies, Learning Technologies and Software Product Lines,” In *Advanced Learning Technologies (ICALT), 2012 IEEE 12th International Conference on*. IEEE, 2012, pp.732-733.
- [C.5] **S. Chimalakonda** and K. V. Nori, “Accelerating Educational Technologies using Software Product Lines,” In *Technology Enhanced Education (ICTEE), 2012 IEEE International Conference on*. IEEE, 2012, pp. 1-4.
- [C.4] **S. Chimalakonda**, “GAMBLE: Towards Ensuring Quality of Education Using Goal Driven Model Based Learning Environments: Automating a Family of eLearning Systems by integrating Lean And Software Product Lines,” In *Advanced Learning Technologies (ICALT), 2011 IEEE International Conference on*. IEEE, 2011, pp. 648-649.

- [C.3] **S. Chimalakonda** and K. V. Nori, “Technological Aids to Improve Quality of Teaching,” In  *Proceedings of ANQ Congress*, 2011
- [C.2] **S. Chimalakonda** and K. V. Nori, “Can we make Software Engineering Education Better by Applying Learning Theories?,” In *Software Engineering Education and Training (CSEE&T), 2011 24th IEEE-CS Conference on*. IEEE, 2011, pp. 648-649.
- [C.1] **S. Chimalakonda** and K. V. Nori, “Automating an eLearning System - A Case Study,” In *Software Engineering Education and Training, 2009.CSEET’09. 22nd Conference on*. IEEE, 2009, pp. 150-153.
- Peer-Reviewed Workshop Papers at ACM/IEEE ICSE
- [W.3] **S. Chimalakonda** and K. V. Nori, “On the Nature of Roles In Software Engineering,” In *Proceedings of the 7th International Workshop on Cooperative and Human Aspects of Software Engineering*. ACM, 2014, pp. 91-94.
- [W.2] **S. Chimalakonda** and K. V. Nori, “What Makes It Hard To Apply Software Product Lines to Educational Technologies?,” In *Product Line Approaches in Software Engineering (PLEASE), 2013 4th International Workshop on*. IEEE, 2013, pp. 17-20.
- [W.1] **S. Chimalakonda** and K. V. Nori, “What Makes It Hard To Design Instructional Software?: Towards a Collaborative Platform for Stakeholders of Instructional Software,” In *Proceedings of the 5th International Workshop on Co-operative and Human Aspects of Software Engineering*. IEEE Press, 2012, pp. 15-19.

## Contributions beyond Publications

- Adult Literacy *Can computing research make significant contributions to society beyond publications?*  
 August 2011 **S. Chimalakonda** and K. V. Nori, “Towards Addressing the Societal Challenge of Quality Education using Technology - Challenges and Research Directions”, *A Preliminary Note on Improving Quality of Education circulated to Planning Commission, August 25th, 2011* [Planning Commission, now NITI AYO, headed by The Prime Minister of India]
- July 2016  32 State Resource Centers (SRC) across India were instructed by *National Literacy Mission Authority* to use our approach and technologies with initial experiments in *Telangana* state

## Research Supervision at IIT Tirupati, India & IIIT-Sri City, India

- Software Engineering *A Classification Framework for Security Vulnerabilities from Github Repositories, An Empirical Study*, **Abhishek Singh** \* A year-long internship at Cisco, Sane Jose, Summer 2017  
*What’s in use and What’s not? An Empirical Study of Programming Constructs in Functional Programming Languages*, **Yashaswini and Seema**
- Educational Technologies *Don’t Read Books, Experience Them! - A Virtual Reality Platform for Enhancing Readability Experience*, **Jagadeesh Ponduru & Aditya Dhall**  
*Design of a Virtual Reality Classroom for Medical Students*, **Raghib Musarrat**  
*Teaching Astronomy to School Children through Virtual Reality, An Experiment with NASA 3D Videos*, **Vamshi Krishna Reppala**  
*Muse, A Musically Inspired Game to Teach Arrays and Linked Lists*, **Raghib Musarrat & Vaishali Sharma**, Submitted to *ITiCSE 2017*  
*Memze: Gamifying Data Structures Based on Contrast Principle*, **Ashish Verma**  
*Like or Dislike, Usability Metrics for Government Mobile Applications*, **Ambuj Tiwari**

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## Selected Honors & Awards

- \* *Microsoft Research Travel Grant* to attend ACM CHI Conference on Human Factors in Computing Systems, CHI 2013
- \* *Microsoft Research Travel Grant* to attend ACM/IEEE International Conference on Software Engineering (ICSE), 2013 and 2012
- \* *ACM SIGSOFT CAPS Travel Grant* to attend ICSE 2013
- \* *SIGSE Travel Grant* to attend ICSE 2012
- \* *TCS International Travel Grant* to attend IEEE 13th International Conference Advanced Learning Technologies (ICALT 2013)
- \* *Grant* to attend International Summer School on Educational Technology 2012, 2013
- \* *IIIT Hyderabad International Travel Grant* to attend ICALT 2012
- \* *Travel Grants* to attend conferences in India - ISEC 2008, 2009, 2012, 2013, ICTEE 2012, India HCI 2011, ISSRE 2009, RE 2007
- \* Part of *Scorpus Innovation Team* (Top 100 IT Innovators by NASSCOM for the year 2007) during my work at *Canarys Automations Ltd.*
- \* Created a *talking resume* in which I introduced myself in 2004 during my engineering and won accolades [and rarely criticism] from CEOs and VPs of many companies

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## Selected Professional Activities/Service

- \* *Member*, IEEE, ACM, Computer Society of India (CSI)
- \* *Member*, ACM SIGSOFT, iSOFT, iSIGCSE, Technical Council on Software Engineering
- \* *Member*, Technical Committee on Learning Technology, IEEE Computer Society
- \* *Session Chair*, Technology Enhanced Language Learning session, ICALT 2013
- \* *Reviewer* for HICSS-45, CHI 2014, ACM TOSEM Journal
- \* *Key contributor of funding proposal "An Eco-System For Delivery of Mobile Learning Content" for ITRA, India for \$5 million (suggested for another stream)*

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## References

Please contact me for references