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I am a Physician and Computer Scientist with residency training in Internal Medicine and a research fellowship in Cardiology. My goal is improving decision making in healthcare using state of the art Artificial Intelligence methods such as machine learning, data mining, pattern recognition and causal discovery.

**Education**

- **Ph.D (Intelligent Systems with Biomedical Informatics track)** University of Pittsburgh, PA. (Dec 05).
  - **Dissertation Topic**—A Bayesian Local Causal Discovery Framework.
  - **Dissertation Committee**
    - ◇ Professor Gregory Cooper (Adviser)
    - ◇ Professor Bruce Buchanan
    - ◇ Professor Peter Spirtes
    - ◇ Professor Michael Wagner
- **M.S. (Computer Science)** University of South Carolina, Columbia, SC. (Dec 94).
  - **Thesis Topic**—MENTOR: A Bayesian Model For Prediction And Intervention In Mental Retardation (Adviser: Professor Marco Valtorta).
- **Post-graduate Training, Internal Medicine** Medical College Hospital, Trivandrum, India (87 – 90).
- **MBBS** Medical College, Trivandrum, India (Jan 87).

**Teaching and Research Positions**

- Director, Discovery Systems Lab, Department of Biomedical Informatics, Vanderbilt University (11/08 – present.)
- Assistant Professor, Department of Biomedical Informatics, Vanderbilt University (7/06 – present.)

- Assistant Professor, Department of Electrical Engineering and Computer Science, Vanderbilt University (7/07 – present.)
- Senior Lecturer, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee (8/03 – 6/06.)
- Teaching Assistant, Introduction to Bioinformatics, Fall semester, 2000.
- Post-doctoral Fellow, Center for Biomedical Informatics, University of Pittsburgh (8/98 – 8/03).
- Postgraduate Researcher, Department of Information and Computer Science, University of California at Irvine (3/96 – 8/98).
  - **Research Topic**—Application And Refinement Of Machine Learning Algorithms To Learn Models From Biomedical Data (Adviser: Professor Michael Pazzani).
- Research Associate (Voluntary), Department of Computer Science, University of South Carolina, Columbia, SC (7/95 – 2/96).
- Programmer and Research Analyst, Department of Family & Preventive Medicine, USC School of Medicine, Columbia, SC (9/91 – 8/94 and 1/95 – 6/95).
- Co-investigator on a project to build a Computer Expert System in Emergency Care Medicine— Electronics Research & Development Center (ER & DC), Govt. of India, Trivandrum (4/90 – 7/91).
- Senior Research Fellow of the Council of Scientific and Industrial Research (CSIR) in the Department of Cardiology, Medical College, Trivandrum, India (4/89 – 7/91).
  - **Research Topic:** Causal Pathways Of Development Of Chronic Rheumatic Carditis From Acute Rheumatic Fever—A Clinical Study (Adviser: Professor C.G. Bahuleyan).

**Membership in Professional Societies, Editorial and Review Boards, Grant Proposal Review Panels and Scientific Program Committees**

- ◇ American Association for Artificial Intelligence (AAAI).
- ◇ American Medical Informatics Association (AMIA).
- ◇ American Association for the Advancement of Science (AAAS).
- ◇ Editorial Board of *Applied Intelligence* Journal.

- ◇ Editorial Board of *The Open Artificial Intelligence Journal*.
- ◇ Publications Committee, American Medical Informatics Association, 1998, and 1999.
- ◇ Reviewer, AMIA Annual Fall Symposium, 1996 to present.
- ◇ Reviewer, *Artificial Intelligence in Medicine*, 2002 onwards.
- ◇ Reviewer, MedInfo (World Congress on Medical Informatics), 2001 onwards.
- ◇ Reviewer, *Machine Learning*, 2007 onwards.
- ◇ Reviewer, *Journal of Machine Learning Research*, 2008 onwards.
- ◇ Reviewer, *Journal of the American Medical Informatics Association*, 2010 onwards.
- ◇ Program Committee, *Uncertainty in Artificial Intelligence (UAI)*, 2008, 2010, 2011.
- ◇ Program Committee, *Probabilistic Problem Solving in BioMedicine (ProBioMed)*, 2011.
- ◇ Reviewer, *Challenge Grants (NIH)*, 2009.
- ◇ Review Panel, *Smart Health and Wellbeing (SHB) Information Management and Data Mining (Small) Proposal (NSF)*, 2011.

### **Teaching Activities**

- ◇ Machine Learning for Biomedicine (Course director), Spring 2008 and 2009.
- ◇ Methodological Foundations of Biomedical Informatics (Co-instructor), Spring 2008, 2009 and 2010.

### **Funded Research Program**

- ◇ Vanderbilt CTSA PF298 (PI: Mani), 11/09/2009 - 11/08/2010, “Gene Expression Profile of Stable Preterm Infants Undergoing Booster Packed Red Blood Cell (PRBC) Transfusion” (Role: PI).
- ◇ AHRQ 1 R03 HS019069-01 (PI: FitzHenry), 07/01/2010 - 05/30/2011, “Pain Assessment & Intervention Needs (PAIN)” (Role: Co-Investigator).
- ◇ NIH/NHLBI 1 U01 HL101456-01 (PI: Aschner), 04/01/2010 - 03/31/2015, “Improving Prematurity-related Respiratory Outcomes at Vanderbilt (IMPROV)” (Role: Co-Investigator).
- ◇ NIH/NLM 1 R01 LM 010681-01 (PI: Xu), 04/01/2010 - 03/31/2013, “Real-Time Disambiguation of Abbreviations in Clinical Notes” (Role: Co-Investigator).

- ◇ NIH/NCI 1 U01 CA142565-01 (PI: Yankeelov), 12/01/2009 - 11/30/2014, “PET-MRI for Assessing Treatment Response in Breast Cancer Clinical Trials” (Role: Co-Investigator).
- ◇ NIH/NCI 1 R01 CA141307-01 (PI: Xu), 07/01/2009 - 06/30/2013, “An In-silico Method for Epidemiological Studies Using Electronic Medical Records” (Role: Co-Investigator).
- ◇ NIH/NLM 5 R01 LM007995-06 (PI: Miller), 02/01/2004 - 06/14/2010, “MOMENT (Monitoring for Outpatient Medication Effects and New Toxicities) in TIME ” (Role: Co-Investigator).
- ◇ NIH/NLM 2 R46 LM007948-04A1 (PI: Aliferis), 07/15/2008 - 11/01/2008, “Causal Discovery Algorithms for Translational Research with High-Throughput Data” (Role: Co-Investigator).

### Honors and Awards

- One of 6 winning teams, Active Learning Challenge, PASCAL 2010.
- Member of team placed second overall, I2B2 Challenge, 2010.
- Finalist, Student Paper Competition, MEDINFO 2004.
- National Library of Medicine post-doctoral fellowship.
- Mellon pre-doctoral fellowship.
- Senior Research Fellowship of the Council of Scientific and Industrial Research (CSIR).
- National Science Talent Search Scholarship, Government of India.
- National Merit Scholarship, Government of India.

### Papers, Publications and Presentations

#### A. JOURNALS INCLUDING MAJOR CONFERENCES AND INTERNATIONAL WORKSHOPS (PEER REVIEWED)

- Min Jiang, Yukun Chen, Mei Liu, Trent S. Rosenbloom, **Subramani Mani**, Joshua C. Denny, Hua Xu. “A Study of Machine Learning based Approaches to Extract Clinical Entities and their Assertions from Discharge Summaries”. *Journal of The American Medical Informatics Association* (To be published in 2011).
- Aliferis C, Statnikov A, Tsamardinos I, **Mani S**, Koutsoukos X. “Local causal and Markov blanket induction for causal discovery and feature selection for classification. Part II: Analysis and extensions”. *Journal of Machine Learning Research* 11:235–284, 2010.

- Aliferis C, Statnikov A, Tsamardinos I, **Mani S**, Koutsoukos X. “Local causal and Markov blanket induction for causal discovery and feature selection for classification. Part I: Algorithms and empirical evaluation”. *Journal of Machine Learning Research* 11:171–234, 2010.
- Chen Y and **Mani S**. “Study of Active Learning in the Challenge”. *Proceedings of the International Joint Conference on Neural Networks*, Barcelona, Spain, 2010.
- Chen Y and **Mani S**. “Active Learning for Unbalanced Data in the Challenge by Considering Multiple Models and Biasing”. (To be published in the *JMLR Proceedings of the Thirteenth International Conference on Artificial Intelligence and Statistics*, Sardinia, Italy in 2010.)
- **Mani S**, Statnikov A and Aliferis C. “Bayesian Algorithms for Causal Data Mining”. *Proceedings of the NIPS workshop on causality*. 6:121–136, 2010.
- Varol A, **Mani S**, Compton D, Fuchs L and Fuchs D. “Early Prediction of Reading Disability using Machine Learning”. *Proceedings of the AMIA fall symposium*, 467–471, 2009.
- **Subramani Mani**, Constantin Aliferis, Shanthi Krishnaswami and Theodore Kotchen. “Learning causal and predictive clinical practice guidelines from data”. *Proceedings of MedInfo*, 2007, p850–854, Klaus A. Kuhn, James R. Warren and Tze-Yun Leong (Eds), IOS Press, Washington DC.
- **Subramani Mani** and Constantin Aliferis. “A Causal Modeling Framework for Generating Clinical Practice Guidelines from Data”. *Lecture Notes in Artificial Intelligence: Artificial Intelligence in Medicine*, AIME 2007, p446–450, Riccardo Bellazzi, Ameen Abu-Hanna and Jim Hunter (Eds), Springer.
- **Subramani Mani**, Peter Spirtes and Gregory F. Cooper. “A theoretical study of Y structures for causal discovery”. *Proceedings of the Conference on Uncertainty in Artificial Intelligence*, UAI 2006, p314–323, Rina Dechter and Thomas S. Richardson (Eds), AUAI Press, Corvallis, OR.
- **Subramani Mani**, Marco Valtorta and Suzanne McDermott. “Building Bayesian Network Models in Medicine: The MENTOR Experience”. *Applied Intelligence* 22, 93–108, 2005.
- **Subramani Mani** and Gregory F. Cooper. “A Bayesian Local Causal Discovery Algorithm”. *Proceedings of the World Congress on Medical Informatics*, MedInfo 2004, p731–735, M. Fieschi et al. (Eds), IOS Press.

- **Subramani Mani** and Gregory F. Cooper. “BLCD2: A Bayesian Local Causal Discovery Algorithm”. (*Draft Proceedings of the 9th Intelligent Data Analysis in Medicine and Pharmacology workshop, IDAMAP 2004, Stanford University.*)
- Michael J. Pazzani, **Subramani Mani** and Rodman Shankle. “Comprehensible Rule Discovery In Medical Databases”. *Methods of Information in Medicine* 40(5), 380–385, 2001.
- **Subramani Mani** and Gregory F. Cooper. “A Simulation Study of Three Related Causal Data Mining Algorithms”. *Proceedings of the International Workshop on Artificial Intelligence and Statistics* 2001, p73–80. Morgan Kaufmann, San Francisco, CA.
- **Subramani Mani** and Gregory F. Cooper. “Causal Discovery from Medical Textual Data”. *Proceedings of the AMIA Annual Fall Symposium*, 2000, p542–546. Hanley and Belfus Publishers, Philadelphia, PA.
- **Subramani Mani**, William R. Shankle, Malcolm B. Dick and Michael J. Pazzani. “Two-Stage Machine Learning Model for Guideline Development”. *Artificial Intelligence in Medicine* 16(1), 51-72, 1999.
- **Subramani Mani**, Malcolm B. Dick, Michael J. Pazzani, Evelyn L. Teng, Daniel Kempler, and I. Maribell Taussig. “Refinement of Neuro-psychological tests for dementia screening in a cross cultural population using Machine Learning”. In W. Horn, Y. Shahr, G. Lindberg, S. Andreassen, J. Wyatt (Eds.), *Lecture Notes in Artificial Intelligence: Artificial Intelligence in Medicine*, AIMDM’99, Vol. 1620, p326-335.
- **Subramani Mani** and Gregory F. Cooper. “A Study in Causal Discovery from Population-Based Infant Birth and Death Records”. *Proceedings of the AMIA Annual Fall Symposium*, 1999, p315–319. Hanley and Belfus Publishers, Philadelphia, PA.
- **Subramani Mani** and Michael J. Pazzani. “Guideline Generation from Data by Induction of Decision Tables Using a Bayesian Network Framework”. *Proceedings of the AMIA Annual Fall Symposium*, 1998, p518–522. Hanley and Belfus Publishers, Philadelphia, PA.
- W.R. Shankle, **Subramani Mani**, Malcolm B. Dick and Michael J. Pazzani. “Simple Models for Estimating Dementia Severity Using Machine Learning” *MedInfo’98: 9th World Congress on Medical Informatics, Seoul, Korea, August 1998.*, proceedings, part 2, p472–476.

- Rodman Shankle, **Subramani Mani**, Michael Pazzani and Padhraic Smyth. “Detecting very early stages of Dementia from normal aging with Machine Learning methods.” In Keravnou, E., Garbay, C., Baud, R., and Wyatt, J., editors, *Lecture Notes in Artificial Intelligence: Artificial Intelligence in Medicine, AIME97, vol 1211, p73–85, Springer, 1997.*
- Michael J. Pazzani, **Subramani Mani**, and W. Rodman Shankle. “Comprehensible Knowledge-Discovery in Databases.” *Nineteenth Annual Conference of the Cognitive Science Society, Proceedings, p596–601, Lawrence Erlbaum Publishers, 1997*
- Michael J. Pazzani, **Subramani Mani**, and W. Rodman Shankle. “Beyond Concise and Colorful: Learning Intelligible Rules” *The Third International Conference on Knowledge Discovery and Data Mining (KDD-97), Proceedings p235–238, AAAI Press, 1997.*
- **Subramani Mani**, Michael Pazzani and John West. “Knowledge Discovery from a Breast Cancer Database.” In Keravnou, E., Garbay, C., Baud, R., and Wyatt, J., editors, *Lecture Notes in Artificial Intelligence: Artificial Intelligence in Medicine, AIME97, vol 1211, p130–133, Springer, 1997.*
- **Subramani Mani**, Suzanne W. McDermott, and Michael J. Pazzani. “Generating Models of Mental Retardation from Data with Machine Learning” *Proceedings IEEE Knowledge and Data Engineering Exchange Workshop (KDEX-97), p114-119, IEEE Computer Society, 1997.*
- Shankle, W.R., **Mani, S.**, Pazzani, M.J., and Smyth, P. “Use of a Computerized Patient Record Database of Normal Aging and Very Mildly Demented Subjects to Compare Classification Accuracies Obtained with Machine Learning Methods and Logistic Regression” *Computing Science and Statistics, 29(2), 201-209, 1997.*
- McDermott, S., Coker, A., **Mani, S.**, Krishnaswami, S., Nagle, R., Barnett-Queen, L. and Wuori, D. “Population based analysis of parent reported behavior problems in children with cerebral palsy”. *Journal of Pediatric Psychology* Vol.21, No.3, pp 447–463, 1996.
- **Subramani Mani**, Marco Valtorta and Suzanne McDermott. “MENTOR: A Bayesian Model for Prediction and Intervention in Mental Retardation”. Fifth International Workshop on Artificial Intelligence and Statistics. Jan 1995, Ft. Lauderdale, Florida.

## B. BOOK CHAPTERS, ABSTRACTS AND TECHNICAL COMMENTS

- **Subramani Mani**. “Note on Friedman’s Fundamental Theorem of Biomedical Informatics”. Letter, *JAMIA 2010, 17:614.*

□ **Subramani Mani** and Changwon Yoo. “A Simulation Study Of Automated Causal Discovery Of Cellular Metabolism”. Poster, Pacific Symposium On Biocomputing, *Symposium Notes, PSB 2003*, p104.

□ **Subramani Mani** and Gregory F. Cooper. “Causal Discovery from Population-Based Infant Birth and Death Records”. Student Abstract, *Proceedings AAAI99*, p973, AAAI Press, Menlo Park, CA.

□ Rodman Shankle, **Subramani Mani**, Michael Pazzani and Padhraic Smyth. “Dementia Screening with Machine Learning methods.” In *Intelligent Data Analysis in Medicine and Pharmacology*, Eds. *Elpida Keravnou, Nada Lavrac and Blaz Zupan*, Kluwer Academic Publishers, p149–166, 1997.

□ **Subramani Mani**, Suzanne W. McDermott, and Michael J. Pazzani. “Detecting Mental Retardation in Newborns and Infants: A Machine Learning Approach” *Pediatrics Supplement* Vol. 100, No. 3, part 2, p443, September 1997. (Abstract).

□ **Subramani Mani**, William R. Shankle, Michael J. Pazzani, Padhraic Smyth and Malcolm B. Dick. “Differential Diagnosis of Dementia: A Knowledge Discovery and Data Mining (KDD) Approach” *JAMIA supplement* p875, 1997. Full paper in extended proceedings (CD ROM).

□ Suzanne McDermott, **Subramani Mani** and Shanthi Krishnaswami. “Population-based analysis of specific behavior problems associated with children with seizures”. *Journal of Epilepsy*, Vol. 8, No. 2, pp 110–118, 1995.

□ McDermott, S., Nagle, R., Wuori, D., Barnett-Queen, L., Coker, A. and **Mani, S.** “Behavior Problems in Children with Cerebral Palsy”. *Developmental Medicine and Child Neurology* Vol.35, No.9, Supplement 69, p13, September 1993. (Abstract).

#### C. TUTORIALS, PRESENTATIONS AND INVITED TALKS

◇ Invited Talk: **Subramani Mani**. “Predictive Modeling Using Machine Learning for Better Clinical Decision Making.” School of Informatics, Indiana University, 2011.

◇ Presentation (Peer reviewed): **Subramani Mani**, Yukun Chen, Tom Elasy, Warren Clayton, Joshua Denny. “Type 2 Diabetes Risk Forecasting from EMR Data using Machine Learning”. Intelligent Data Analysis in Medicine and Pharmacology (IDAMAP) Workshop, Washington DC, 2010.

◇ Invited Talk: **Subramani Mani**. “Neonatal Sepsis Prediction with Machine Learning.” Amritha Institute of Medical Sciences, Cochin, India, 2009.

◇ Presentation (Peer reviewed): **Subramani Mani**, Jörn-Hendrik Weitekamp, Constantin F Aliferis, Asli Ozdas, Huseyin Atakan Varol, Qingxia Chen, Randy Carnevale, Steven Steele. “Neonatal Sepsis Prediction with Machine Learning”. Intelligent Data Analysis in Medicine and Pharmacology (IDAMAP) Workshop, Washington DC, 2008.

◇ Invited Talk: **Subramani Mani**. “The Science of Biomedical Informatics.” Medical College, Trivandrum, India, 2008.

◇ Tutorial: **Subramani Mani**. “Causal Discovery from Biomedical Data.” Artificial Intelligence in Medicine Europe (AIME) Conference, Aberdeen, Scotland, 2005.

◇ Invited Talk: **Subramani Mani**. “Causal Discovery from Biomedical Data.” Regional Cancer Center, Trivandrum, India, 2005.

### **Citizenship**

Citizen of India.

### **Visa Status**

US permanent resident.