

# In Memoriam Shabbir Ahmed

Husband & Father,  
Colleague,  
Collaborator,  
Mentor,  
Friend



# A Distinguished Career

- 1993, B. Eng, Mechanical Engineering, Bangladesh University of Engineering and Technology
- 1997, M.S. 2000, PhD, Industrial Engineering, University of Illinois at Urbana-Champaign, advisor: Nick Sahinidis
- 2000, INFORMS Dantzig Dissertation Award
- 2000, joined ISyE, Georgia Tech
- 2002, NSF CAREER, 2002, 2005 IBM Research Award
- 2006-2008, Stochastic programming vice chair of INFORMS Optimization Society
- 2007-2010, Chair of the community of stochastic programming
- 2007, Semiplenary speaker, XI ICSP
- 2014, ISyE Steward Faculty Fellow, Dean's Professor of College of Engineering
- 2016, Plenary speaker, XIV ICSP
- 2017 class INFORMS Fellow
- 2017, ISyE Anderson-Interface Chair
- 2017, INFORMS Computing Society Prize
- 2018, Plenary speaker, INFORMS Optimization Society Conference and ISMP
- 2018, INFORMS Optimization Society Farkas Prize
- Graduated 27 PhD students, 89 Published papers + many more in progress

# 2017 INFORMS Stochastic Programming Fellows



# A Great Colleague at ISyE, Georgia Tech

Selected quotes from: <https://www.isye.gatech.edu/news/memoriam-shabbir-ahmed>

“He had a brilliant research and teaching career, but more importantly, he was a dear friend and a generous colleague” – Georgia Tech ISyE Chair, Edwin Romeijn

“He was very kind about sharing his time with everyone, especially junior faculty.” – Turgay Ayer

“He always made me feel like I could succeed.” – Santanu Dey

“His insights were highly non-trivial, and every time we met he added a dimension that I had completely overlooked” – Sebastian Pokutta

“Shabbir was incredibly generous with his time, and for such a star, he was so humble and so kind.” – Alejandro Toriello

“Shabbir was the best colleague one can dream of. He was always unassuming with a smile but delivered amazing results.” – Chen Zhou

“While some people are experts in theory and others in application, Shabbir put it all together.” – George Nemhauser

“He impacted those around him in more important ways than his research.” – Cole Smith

# Memorial Workshop for Shabbir

- ISyE Georgia Tech will host a memorial workshop for Shabbir
- Time: November 13, 2019
- Place: Georgia Tech, Atlanta.
- You are all cordially invited.



The H. Milton Stewart School  
of Industrial and Systems Engineering



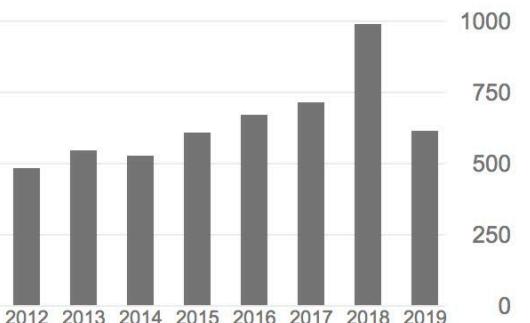
## Shabbir Ahmed

[FOLLOW](#)Professor of Industrial & Systems Engineering, [Georgia Institute of Technology](#)Verified email at isye.gatech.edu - [Homepage](#)[Stochastic programming](#) [Integer Programming](#) [Mathematical Programming](#) [Optimization](#)  
[Operations Research](#)

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Co-authors

[VIEW ALL](#)George Nemhauser  
Professor, Georgia Institute of Te...Alexander Shapiro  
Professor, Georgia TechNick Sahinidis  
Swearingen Professor, Carnegie ...Santanu S. Dey  
Georgia Institute of Technology

James Luedtke



| TITLE   | CITED BY | YEAR |
|---|----------|------|
| <a href="#">A stochastic programming approach for supply chain network design under uncertainty</a><br>T Santoso, S Ahmed, M Goetschalckx, A Shapiro<br>European Journal of Operational Research 167 (1), 96-115                                  | 1106     | 2005 |
| <a href="#">A sample approximation approach for optimization with probabilistic constraints</a><br>J Luedtke, S Ahmed<br>SIAM Journal on Optimization 19 (2), 674-699   | 399      | 2008 |
| <a href="#">The sample average approximation method applied to stochastic routing problems: a computational study</a><br>B Verweij, S Ahmed, AJ Kleywegt, G Nemhauser, A Shapiro<br>Computational Optimization and Applications 24 (2-3), 289-333 | 375      | 2003 |
| <a href="#">A multi-stage stochastic integer programming approach for capacity expansion under uncertainty</a><br>S Ahmed, AJ King, G Parija<br>Journal of Global Optimization 26 (1), 3-24   | 371      | 2003 |
| <a href="#">Sample average approximation method for chance constrained programming: theory and applications</a><br>BK Pagnoncelli, S Ahmed, A Shapiro<br>Journal of optimization theory and applications 142 (2), 399-416                         | 355 *    | 2009 |
| <a href="#">A finite branch-and-bound algorithm for two-stage stochastic integer programs</a><br>S Ahmed, M Tawarmalani, NV Sahinidis<br>Mathematical Programming 100 (2), 355-377  | 269      | 2004 |

# Research Profile



**Overview focus: Definitely a Stochastic Programmer (heavily in stochastic IP and chance-constrained stochastic program)**

- Also methodology contributions in robust optimization, integer programming, and submodular optimization
- Applications in production/expansion planning, supply chain management, energy systems, etc.

# Stochastic IP Methodology

## Value Function Approaches for Two-Stage Stochastic Program

- A finite branch-and-bound algorithm for two-stage stochastic integer programs, with Tawarmalani and Sahinidis

## Cutting Planes for the Deterministic Equivalent Formulations

- Cutting planes for multistage stochastic integer programs, with G\* and Nemhauser

## Totally Unimodular Analysis for Stochastic IP

- Totally unimodular stochastic programs, with Kong and Schaefer

## Decomposition Approaches

- A scenario decomposition algorithm for 0-1 stochastic programs.
- Stochastic dual dynamic integer programming, with Zou and Sun

# Applications

## Applications in Supply Chain, Production Planning and Energy Systems

- A stochastic programming approach for supply chain network design under uncertainty, with Santoso, Goetschalckx, and Shapiro.
- The sample average approximation method applied to stochastic routing problems: a computational study, with Verweij, Kleywegt, Nemhauser, and Shapiro
- Supply chain design under uncertainty using sample average approximation and dual decomposition, with Schütz and Tomaskard
- A branch-and-cut algorithm for the stochastic uncapacitated lot-sizing problem, with G\*, Nemhauser, and Miller
- Multistage stochastic unit commitment using stochastic dual dynamic integer programming, with Zou and Sun

# Shabbir - Chance-Constrained Optimization

See ISMP 2018 Plenary online at: [ismp2018.sciencesconf.org](https://ismp2018.sciencesconf.org) (Starts a few minutes in)



A photograph of a man giving a presentation. He is wearing a light blue long-sleeved shirt and dark trousers, and has a name tag around his neck. He is gesturing with his right hand while speaking. To his left is a white slide with a green header containing the word "PLAN". Below the header, there is a bulleted list of topics:

- ▶ Background
- ▶ Sampled Approximations
- ▶ MIP Approaches
- ▶ Bicriteria Approximation
- ▶ Distributionally Robust Chance Constraints

The slide has a decorative border of colored circles.

# Shabbir- Risk-Averse Optimization

## Convexity and decomposition

- Connection between ability to apply decomposition methods and convexity of risk measures

## Maximizing submodular utility function, expected utility

### (+Atamturk, Yu)

- Establish connection between submodular optimization and 0-1 expected utility maximization
- Polyhedral analysis yields impactful cutting planes

## Minimax Stochastic Programs (+Shapiro)

- Early contribution (2004) to DRO literature, yielding reformulations for moment-based ambiguity sets

# Importance of Students to Shabbir



# Importance of Students to Shabbir



# Importance of Students to Shabbir

- Text message exchange shared by Weijun Xie



# Shabbir The Reviewer



Wed 4/7/2010 3:10 PM

Shabbir Ahmed <sahmed@isye.gatech.edu>

Re: [Fwd: MPC54] [REDACTED]

To Jeffrey Linderoth

We removed extra line breaks from this message.

[Report Spam](#)

True That!

+ Get more ap

You know that stochastic programmers are the slowest bunch of reviewers.

I got a 3 line report and have been promised another "soon". Can I have some more time (till end of April)?

-Shabbir

Jeff Linderoth wrote:

> Hi Shabbir,  
>  
> Any word on MPC54? You don't want me to sick Bill on you....  
>  
> Thanks!  
>  
> Cheers,  
> -Jeff

# Shabbir The COSP Leader

1. **Saved the Stochastic Programming Society** by establishing the society as an official Technical Section under the Mathematical Optimization Society
2. **Was the driving force** behind the establishment of the SPS Student Paper Prize. (Now the Dupacova-Prekopa Prize).

# Shabbir The Caring Optimizer



**Shabbir Ahmed** @Shabbir0Ahmed · 5 Jan 2016

Jitka Dupakova passed away yesterday. Huge loss to #StochasticProgramming



2



2



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**Shabbir Ahmed** @Shabbir0Ahmed · 22 Sep 2016

Saddened by the passing of Stochastic Programming giant András Prékopa.  
[stoprog.org/sites/default/...](http://stoprog.org/sites/default/)



4



1



**Shabbir Ahmed** @Shabbir0Ahmed · 11 Oct 2016

Shocked and saddened by the passing of Maarten van der Vlerk.  
[lnmb.nl/pages/news/news...](http://lnmb.nl/pages/news/news...)



2



3



1



**Shabbir Ahmed** @Shabbir0Ahmed · 17 Nov 2016

Another stochastic programmer passes away! Farewell Marida Bertocchi, we will miss you. [www00.unibg.it/struttura/stru...](http://www00.unibg.it/struttura/stru...)



**Shabbir Ahmed** @Shabbir0Ahmed · 15 Aug 2016

Shocked and saddened by the passing of Chris Floudas!  
[m.theeagle.com/news/a\\_m/prest...](http://m.theeagle.com/news/a_m/prest...)



3



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Shabbir Ahmed Retweeted

# Shabbir The Entrepreneur

## ProsumerGrid

### Our Leadership

#### Meet Our Team

ProsumerGrid's team includes a diverse group of experts in power systems, optimization, control systems, and business strategy.



Santiago Grijalva,  
PhD  
Chairman



John Higley  
CFO



Dr. Grijalva has more than 20 years of experience in



Shabbir Ahmed, PhD  
VP of R&D



Marcelo Sandoval,  
Msc, MBA, PMP  
COO



Umer Tariq, PhD  
Software Architect



Mr. Higley has been a management consultant

Dr. Ahmed is a Professor in the School of Industrial &

Marcelo is a last-year Ph D Candidate and

Dr. Tariq received his PhD and MS from School of

# Shabbir The Family Fan

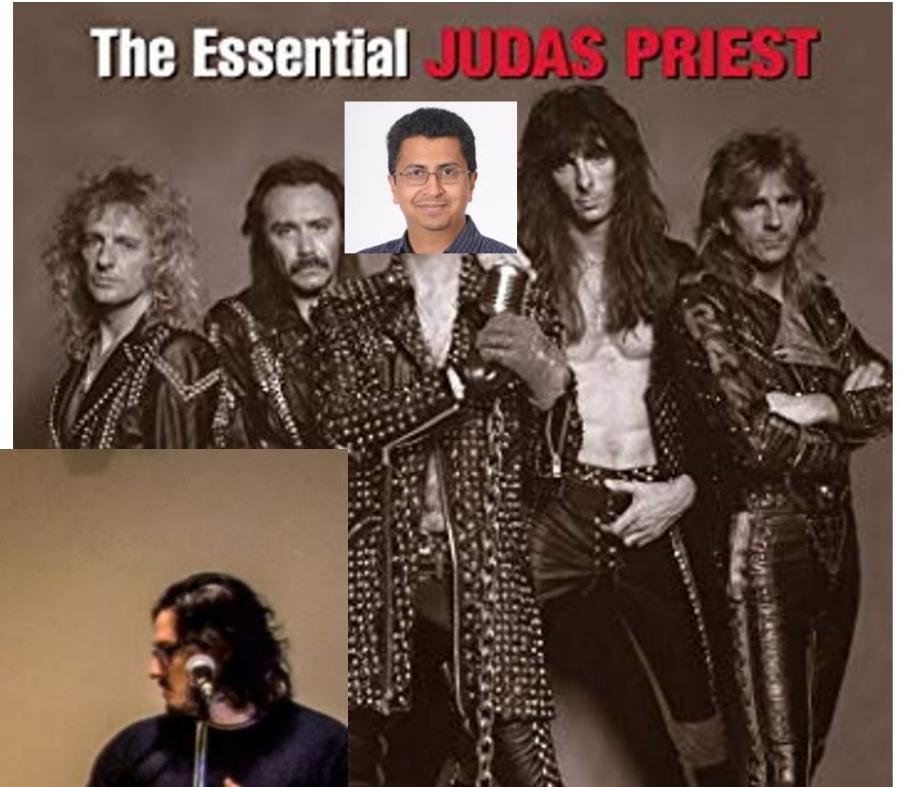


He leaves  
behind his  
loving wife  
Rasha and their  
daughters  
Raeeva (18) and  
Umana (16)

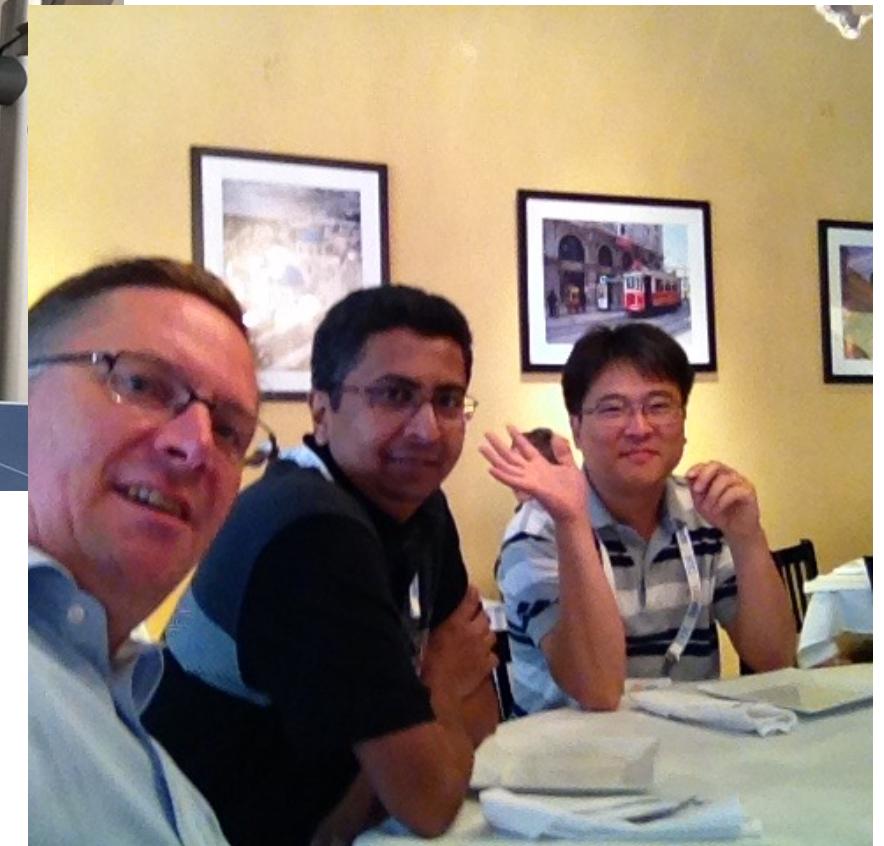
# Shabbir The Musician



The Essential **JUDAS PRIEST**



# Shabbir The Friend



# **Open Remarks/Memories**