

PURDUE
UNIVERSITY

Davidson School of
Chemical Engineering



*A Legacy of
Leadership*

Arvind Varma

1947-2019



Arvind Varma: *From the President*



Arvind Varma, the R. Games Slayter Distinguished Professor of Chemical Engineering and 10th Head of the Davidson School of Chemical Engineering, will forever be remembered for his ground breaking research in the areas of hydrogen and other energy sources, chemical and catalytic reaction engineering, and in the synthesis of advanced materials. He was also renowned for his leadership in the field of chemical engineering.

Arvind arrived at Purdue from Notre Dame in January 2004 and served as Head of the Davidson School of Chemical Engineering through July 2016. During his tenure, he oversaw significant growth in faculty, graduate student, and undergraduate student numbers; increased research expenditures; expanded facilities and equipment, as well as renovations to existing space and the addition of a new wing (dedicated in October 2004). He also led the celebration of the School's Centennial (2011) and had a tremendous grasp of and respect for the School's history.

Arvind took great pride in his leadership role with the faculty and also enjoyed celebrating the accomplishments of the graduate students with whom he worked so tirelessly. Arvind's legacy is his steadfast commitment to the relationships he built with the students, the faculty and the alumni of the School of Chemical Engineering. Recognizing that any place is only as good as its people, there is no questioning Arvind Varma's everlasting impact on Purdue.

Sincerely,

Mitchell E. Daniels, Jr.
President



Table of Contents

Arvind Varma: Key Dates.....	2
Thank You for Attending.....	3
Arvind: My Amazing Friend	4-5
Arvind Varma Academic Tree	6-7
Celebration of Career Agenda	8-10
Financial Impact: Varma Legacy	11
Arvind Varma: Memorable Moments.....	12-13

Arvind Varma: *Key Dates*

BIRTH: October 13, 1947, Firozabad, India

EDUCATION:

- BS Chemical Engineering, Panjab University, India, 1966
- MS Chemical Engineering, University of New Brunswick, Canada, 1968
- PhD Chemical Engineering, University of Minnesota, 1972

PROFESSIONAL EXPERIENCE:

- Assistant Professor, University of Minnesota, 1972-1973
- Senior Research Engineer, Union Carbide Corporation, 1973-1975
- University of Notre Dame, Department of Chemical Engineering:
 - Assistant Professor, 1975-1977
 - Associate Professor, 1977-1980
 - Professor, 1980-1988
 - Chairman, 1982-1988
 - Arthur J. Schmitt Professor, 1988-2003
 - Director (founding), Center for Molecularly Engineered Materials, 2000-2003
- Purdue University, Davidson School of Chemical Engineering:
 - Jay and Cynthia Ihlenfeld Head, 2004-2016
 - R. Games Slayter Distinguished Professor, 2004-2019

AWARDS AND HONORS:

- R.H. Wilhelm Award, AIChE, 1993
- Series Editor (Founding), Cambridge Series in Chemical Engineering, 1996-present
- Chemical Engineering Lectureship Award, ASEE, 2000
- Honorary Fellow (Inaugural batch), Indian Institute of Chemical Engineers, 2001
- Distinguished University Alumnus, Panjab University, 2008
- Fellow, AIChE, 2008
- Elected Foreign Member, Academy of Engineering, Mexico, 2010
- Fellow, American Association for the Advancement of Science, 2011
- Fellow, Industrial & Engineering Chemistry Division, American Chemical Society, 2011
- Warren K. Lewis Award, AIChE, 2013
- Giulio Natta Medal in Chemical Engineering, Politecnico di Milano, Italy, 2017
- Benjamin Garver Lamme Award, ASEE, 2018



Thank You for Attending

On July 14, 2019, our esteemed colleague and friend, Arvind Varma, passed away after a brave fight with pancreatic cancer. Although greatly saddened by this event, we aim to conduct this symposium in the same positive spirit with which he dealt with his disease for four years. Arvind's positive demeanor and amazing dedication to work continued to the very last.

We therefore welcome you with pride to the Arvind Varma Memorial Symposium. We dedicate this symposium to celebrate and honor his accomplishments, thirteen years of committed leadership, and extraordinary service to the Davidson School of Chemical Engineering at Purdue University.

Arvind: *My Amazing Friend*

This tale is in praise of an amazing friend
That began close to a half-century ago
One that abounds with inspiring traits
It runs to this day with unabated tempo!

I search for the best among all his traits
Traversing his feats from one to another
Wondering if it is just what was said
But always finding something further!

One fine day at the IIT in Kanpur
A handsome youth emerged to the fore
He hailed from ChE at Minnesota
To speak softly with symbols galore!

I mused: Here's music to my ears!
Sung by a multi-faced reactor
Of violence hidden behind innocence
Of a tricky Arrhenius' factor!

Hark! Is this then the best of his traits?
Yes, it seemed 'til he grabbed the scepter
At Notre Dame as a tender youth
And built a school a great deal better!

This he did by courting leading minds
And coaxing them to Notre Dame!
Indeed this trait was at least as good
As all else that surged his fame.

Donned with the Arthur Schmitt Chair
He explored fields with great success
And founded a new research center
A notable feat of significance no less!

He won the Wilhelm from AIChE
The Lewis too, thus a leading researcher
An educator as well, said the ASEE!
More kudos as an inspiring teacher!

These are the many traits of academics
For Arvind there were more to be true
For challenges raged a few miles south
As Distinguished Prof, he joined Purdue.

For more than a decade he led as a Head
Hiring faculty that were the very best
Building up a legacy of high scholarship
And an air of excellence and zest!

Although new to raising resources
He briskly sought to fill the role
Seeking alumni, affluent and willing
Soon endowments were on a roll!

Funding Named & Distinguished Chairs
Graduate Fellowships and more.
Numerous other departmental needs
And the School's reputation began to soar!

He tirelessly toiled for his faculty
On promotion to national recognition
With success of which everyone knew
Except a certain national publication!

These feats are too dense to weigh
Would leadership be his winning trait?
As it vies with all else in this tale
Yes, but I hear a cry bellowing "wait!"

What about the last four years
Stricken with a cancer that does most in
Braving with a resolute smile
And taking it on the chin!

There is no single trait of a man
Who strives for perfection
In all he does, so we humbly bow
To him in reverence and approbation!

— Ramki

Arvind Varma Academic Tree

ARVIND'S
STUDENTS

University of Notre Dame:

1978 Carmo J. Pereira	1984 B. Subramaniam	1992 Richard Pigeon	1999 Alexi Pelekh
1979 Antonio L. DeVera	1986 Raj Chemburkar	1993 Alexi Gavriilidis	2000 R. Souleimanova
1979 Steve C. Paspek	1986 M. Kosanovich	1994 D. Chatzopoulos	2002 V. Diakov
1980 D. T.-J. Huang	1987 R. Herrera	1994 Uhlick Stafford	2002 R. Huang
1980 J. B. Wang	1987 Cassian Lee	1996 C. Kachelmyer	2002 Cheryl Lau
1981 V. Ravichandran	1987 Massimo Morbidelli	1996 Mostafa Maalmi	2002 L. Thiers
1982 N. Jothi	1988 E Bauman	1997 S. Hwang	2002 Benjamin Wilhite
1983 A. Shaikh	1988 D. Price	1997 John Szegner	2005 Kishori Deshpande
1984 S. Dhalewadikar	1992 J. -P. Lebrat	1997 RaeAnn Wu	2005 Chris Norfolk

Purdue University:

2005 Moiz Diwan	2014 Andy Koswara
2005 Peter Erri	2015 Danni Gao
2006 Soon Kay Teoh MS	2015 Gregory Honda
2007 Timothy Andrzejak	2015 Shinbeom Lee
2011 Wenbin Hu	2019 Ryan Adams
2012 Ahmad Al-Kukhun	2019 Wooram Kang
2013 Ranjita Ghose	- Rexonni Lagare (<i>current student</i>)

Southeast University (China): 2014 Yang Ziao

Arvind Varma 1972, Minnesota



Neal R. Amundson 1945, Minnesota

Hugh L. Turritin 1933, Minnesota

Rudolph E. Langer 1922, Harvard

George D. Birkhoff 1907, Chicago

E. H. Moore 1885, Yale

H.A. Newton 1850, Yale

Michel Chasles 1814, École Polytechnique

Simeon D. Poisson 1800, École Polytechnique

Joseph L. Lagrange 1754, Torino

Pierre-Simon Laplace

Leonhard Euler 1726, Basel

Jean le Rond d'Alembert

Johann Bernoulli 1694, Basel

Jacob Bernoulli 1676, Basel

Arvind Varma: *Celebration of Career Agenda*

SUNDAY OCTOBER 13, 2019

All events, except reception and dinner, to take place in
Forney Hall, 480 Stadium Mall Drive, West Lafayette, IN 47907

12:00 pm **LUNCH**

12:50 pm **OPENING REMARKS:**

Sangtae Kim, Jay and Cynthia Ihlenfeld Head, Davidson School of Chemical Engineering, Purdue University

1:00 pm **Doraiswami Ramkrishna**, Harry Creighton Peffer Distinguished Professor, Davidson School of Chemical Engineering, Purdue University

1:20 pm **Charles Davidson** (BSChE 1972, Purdue), Venture Partner, Quantum Energy Partners

1:40 pm **Carmo Pereira** (PhD 1978, Notre Dame), DuPont Fellow, DuPont de Nemours Co.

2:00 pm **Massimo Morbidelli** (PhD 1987, Notre Dame), Dipartimento di Chimica, Materiali e Ingegneria Chimica, Giulio Natta, Politecnico di Milano

2:20 pm **Evan Bauman** (PhD 1988, Notre Dame), Shell Oil Company (retired)

2:40 pm **Peter Erri** (PhD 2007, Purdue), Manager – Active Ingredient Manufacturing Strategy & Operational Excellence, Crop Science Division, Bayer AG

3:00 pm **BREAK**

3:20 pm **Danni Gao** (PhD 2014, Purdue), Research Engineer, Shell Oil Company

3:40 pm **Edward Maginn**, Dorini Family Professor & Department Chair, Department of Chemical and Biomolecular Engineering, University of Notre Dame

Arvind Varma: *Celebration of Career Agenda*

4:00 pm

Rex Reklaitis, Burton and Kathryn Gedge Distinguished Professor of Chemical Engineering, Davidson School of Chemical Engineering, Purdue University

4:20 pm

ADJOURN

6:00 pm

RECEPTION: Lafayette Country Club
1500 South 9th Street
Lafayette, IN 47905

7:00 pm

DINNER

8:00 pm

DINNER SPEAKERS:

Gayle Jameson, Nurse Practitioner, Clinical Investigator, Honor Health Research Institute

Karen Varma

Leah Jamieson, Ransburg Distinguished Professor of Electrical and Computer Engineering, John A. Edwardson Dean Emerita of Engineering, Purdue University

Michael Graff, (MSChE 1979, Purdue), Chairman and CEO, American Air Liquide

Sangtae Kim, Jay and Cynthia Ihlenfeld Head, Davidson School of Chemical Engineering, Purdue University

9:00 pm

ADJOURN

See next page for October 14 agenda.

Arvind Varma: Celebration of Career Agenda

MONDAY OCTOBER 14, 2019

All events to take place in Discovery Learning Center,
207 South Martin Jischke Drive, West Lafayette IN, 47907

7:30 am

BREAKFAST

8:00 am

OPENING REMARKS

8:15 am

"Reactive Metal-Support Interaction on 2D Metal Carbide,"
Yue Wu, Herbert L. Stiles Associate Professor, Iowa State University

8:45 am

"Hydrogen Production and Use in a Solar Economy,"
Rakesh Agrawal, Winthrop E. Stone Distinguished Professor of
Chemical Engineering, Purdue University

9:15 am

"Ad Astra Per Renewables: Systematic Valorization of Lignin,"
Bala Subramaniam, Dan F. Servey Distinguished Professor of
Chemical and Petroleum Engineering, University of Kansas

9:45 am

"Process Intensification and Modular Chemicals Production –
Emerging Reaction Engineering Opportunities and Challenges,"
Benjamin Wilhite, Associate Professor, Texas A&M University

10:15 am

BREAK

10:30 am

"Tangible Impact of Enabling Technologies such as Predictive
Modeling, Flow, and Automation for Efficient Biopharmaceutical
Process Development and Manufacturing,"
Moiz Diwan, Director, Pharmaceutical Development, AbbVie

11:00 am

"Materials by Design for Safer Rechargeable Batteries," **Vilas Pol**,
Associate Professor of Chemical Engineering, Purdue University

11:30 am

"Parametric Sensitivity and Runaway in Fixed-Bed Reactors,"
Yang Xiao, Research Scientist, Davidson School of Chemical
Engineering, Purdue University

12:00 pm

LUNCH

CONCLUDING REMARKS:

Mung Chiang, John A. Edwardson Dean of the College of
Engineering, Purdue University

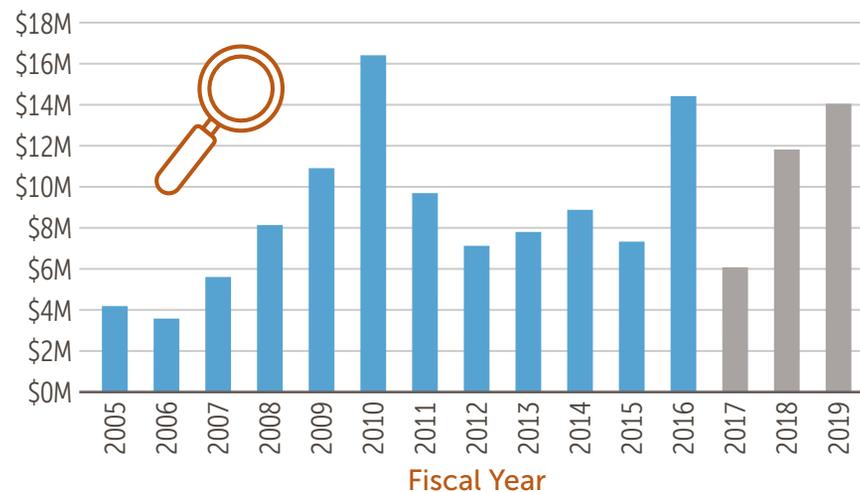
Sangtae Kim, Jay and Cynthia Ihlenfeld Head, Davidson School of
Chemical Engineering, Purdue University

1.00 pm

ADJOURN

Financial Impact: Varma Legacy

Chemical Engineering Total Research Awards 2005 – 2016, \$104M

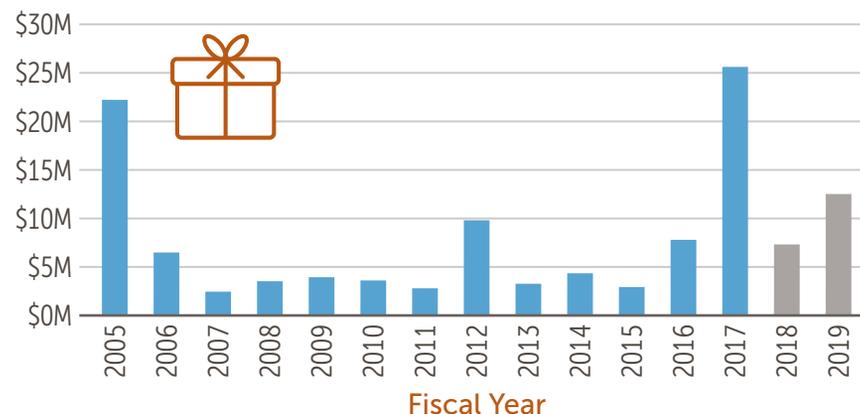


KEY

■ Varma Headship

■ Varma Effect

Chemical Engineering Total Gift Production 2005 – 2017, \$99M



Arvind Varma: *Memorable Moments*



From left:
With Sangtae Kim, Jay and Cynthia Ihlenfeld Head of Chemical Engineering; Jay Ihlenfeld (BSChE 1974); Doraiswami Ramkrishna, Harry Creighton Peffer Distinguished Professor of Chemical Engineering; and Rakesh Agrawal, Winthrop E. Stone Distinguished Professor of Chemical Engineering.

During the October 7, 2011 Centennial activities, with Purdue President France Córdoba and Michael Graff, Chairman and CEO, American Air Liquide.



Dr. Arvind Varma celebrates the 100th birthday of alumnus Robert Henson (BSChE 1936) on October 11, 2014 at the Cherokee Country Club in Atlanta, Georgia.

Arvind Varma: *Memorable Moments*

Arvind Varma received the 2018 ASEE Benjamin Garver Lamme Award during the Annual Awards Luncheon at the 2018 ASEE Exposition on June 27 in Salt Lake City, Utah.



Arvind Varma with a portrait of President George Washington at the White House during the presentation of the National Medal of Technology and Innovation to Nancy Ho by President Barack Obama.

Karen Varma, Nancy Ho, and Arvind Varma at the White House in May 2016 for presentation of the National Medal of Technology and Innovation by President Barack Obama to Dr. Ho.





From left: Charles Davidson (BSChE 1972), Nancy Davidson, Arvind Varma, and Sangtae Kim at the School Naming on November 11, 2016, in the Henson Atrium, Forney Hall of Chemical Engineering.



From left: Purdue President Martin Jischke, Arvind Varma, Marilyn Forney (BSChE 1947), Robert Forney (BSChE 1947, MSIE 1948, PhD 1950), and College of Engineering Dean Linda Katehi at the October 22, 2004 Dedication of Forney Hall of Chemical Engineering.