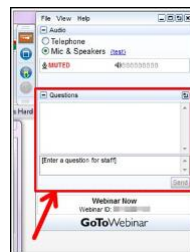
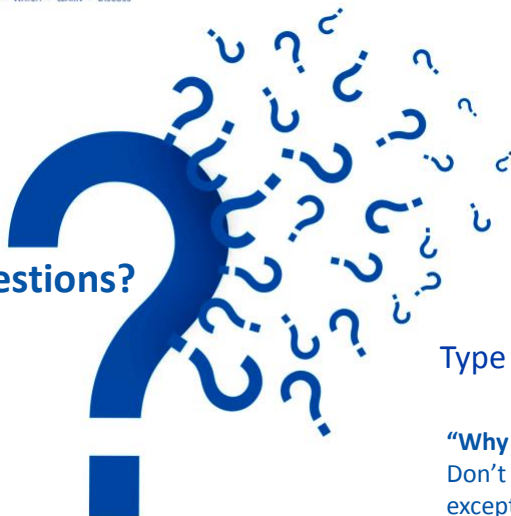


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Hilda Pedraza  
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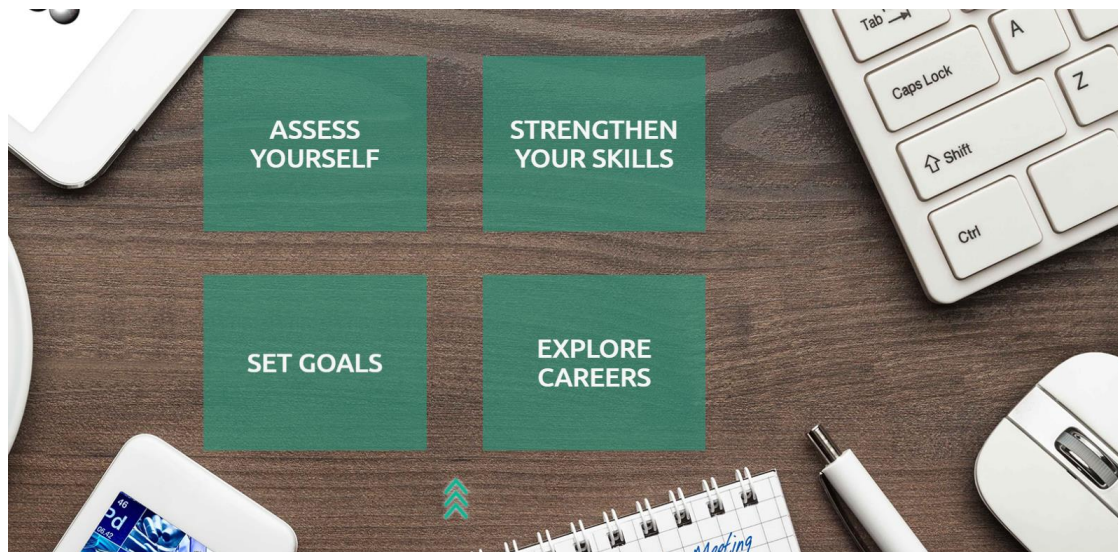
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  - 2 Long-Acting Injectable Medications: Strategies and Mechanistic Considerations: James Remarke - Alkermat; Anthony Bass - Merck
  - 3 Modified Release Formulations for Solubility Stalled Compounds: Mergues Hu - Merck; John Mariani - BMS
  - 4 The Medicinal Chemistry of Tamoxifen (Special Topic): Joe Barish - Jubilant; Raji Nagendri - Merck; Nitin Sood - Team Case Angler
- II - Beyond Traditional Small Molecules
  - 5 Design of Deliverable Macromolecules: Scott Loney - UC Santa Cruz; Nicholas Meanwell - BMS
  - 6 Drawing Big and Thinking Small: Applying Medicinal Chemistry Strategy to Antibody-Drug Conjugates: L. Nathan Tully - Pfizer; Peter Senter - Genentech
  - 7 Nucleic Acids Therapeutics: Making Sense of Antisense Oligonucleotides: Paul Scharf - Genentech; Richard Dixon - BMS
  - 8 Crystallography as a Drug Design and Delivery Tool (Special Topic): Robert Kamboj - Crystal Pharmachem; Vincent Sisti - Abbvie; Andrew Brunstul - Merck
- III - Pharmacology Revisited
  - 9 Dealing with Reactive Drug Metabolites in Drug Discovery: Can We Predict Toxicities of Drug Candidates that Form Reactive Metabolites?: Deenan Dairis - Pfizer; Research Paper Exchange - Vanderbilt University
  - 10 Rational Design of Small Molecules Targeting RNA: Matt Dineley - Corcept; Bill Ruzick - Amgen; Gerner - University of Erlangen
  - 11 Cell Penetrating Peptides to Improve Cellular Drug Uptake: Dennis De - The Ohio State University; Scott Hahn - Bristol-Myers Squibb

## 2017

- I - Fighting Cancer
  - 1 Fighting Cancer: Targeting CNS Malignancy with Kinase Inhibitors: Timothy S. Ashton - Genentech; Mark Wotman - Bristol-Myers Squibb
  - 2 Fighting Cancer: Epigenetic targets for Oncology: Stuart Conway - Oxford; Shawn Sagar - AstraZeneca
  - 3 Fighting Cancer: Allosensory and Targeting Cancer Cell Metabolism: Stefan Gross - Agost; Scott Edmonston - AstraZeneca
- Special Broadcast
  - 4 Cyclic Peptide: Discovery of CTRF Modulators: Peter Grotenhuis - Vertex; Nick Meanwell - Bristol-Myers Squibb
- II - Anti-infectives
  - 5 Anti-infectives: Rational Approaches to the Design and Optimization: Jason Selis - Brown University; Courtney Aldrich - University of Minnesota
  - 6 Tuberculosis: An Introduction for Medicinal Chemists: Carl Nathan - Well Come Medicine; Christopher Boyle - Merck
  - 7 Viral Hepatitis: The Search for a Cure: Mike Sofia - Amicus Biopharma; Stephen Mason - GlaxoSmithKline Corporation
- Special Broadcast
  - 8 Social Molecular Biology: Kevin Hodgson - Harvard Medical School; Alyson Waldmann - ACS Publications
- III - Immunology
  - 9 Precision: Treatment and Novel Approaches: Frank Nispe - Amgen; John Morrison - Bristol-Myers Squibb
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Appalachian State University



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Michael Pollastrri  
Northeastern University



Félix Calderón  
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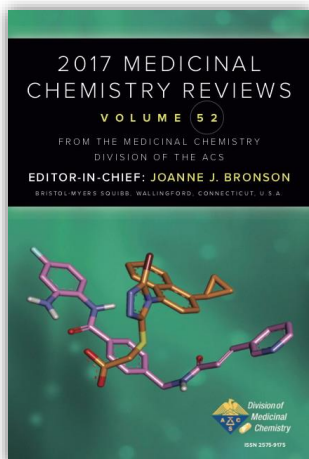


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# Women

in Drug Discovery and Development

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## Annette Bak



Senior Director, Head of Advanced Drug Delivery,  
Innovative Medicines and Early Development, Astra Zeneca

# Annette Bak



## Career Mission Statement



To serve in a pharmaceutical industry leadership position where my entrepreneurial spirit and proven **“make it happen”** abilities, combined with my scientific leadership, experience, and commitment to creating value for others, can make a distinct difference for the organization and patients.



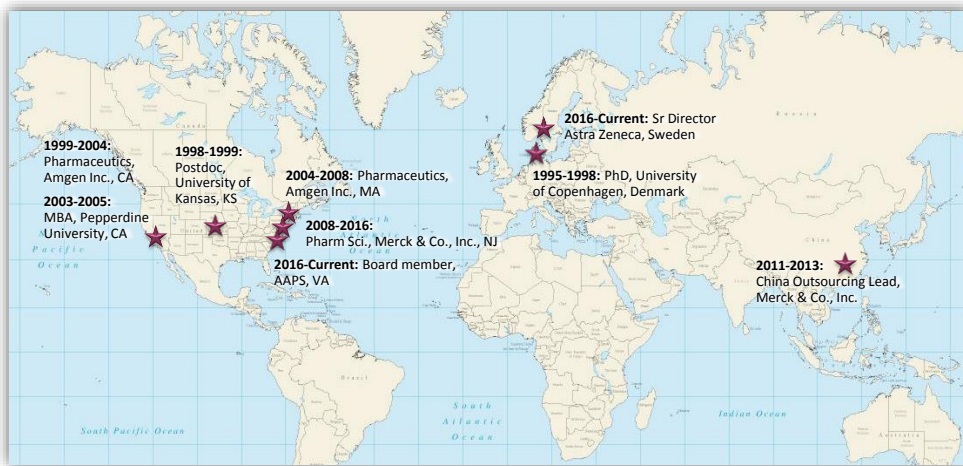
*“Your life is your message to the world. Make sure it’s inspiring!”*  
Youth Peace Council, 2012



## The World as a Playing Field



Annette Bak





## Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



**How much time do you spend working on development areas vs. using your strengths in your current role?**

- All my time is working on my strengths
- About a quarter on development areas and three quarters on strengths
- About half on development areas and half on strengths
- About all my time is working on development areas

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## Use Your Talent Fully...

And you will be great irrespective of gender



Annette Bak



## Be Bold and Deliberate...



Annette Bak

Control what is important to you



## Follow Your Passion...



Annette Bak

Select a meaningful, enjoyable pursuit



## Pay Back to the Scientific Community...

Science accelerates when shared



Annette Bak



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## Play the Global Game...

It will challenge, stretch and amaze you



Annette Bak



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## To All the Great People that Have Shaped My Career...



Your insights, curiosity, and ambitions have been an invaluable learning opportunity for me



Annette Bak

## Biography and Contact Information



Annette Bak

- **20 years experience in global pharma – Amgen Inc, Merck & co, and now AstraZeneca**
  - Leading a department of drug delivery scientists and analytical chemists across Sweden, UK, US responsible for advanced drug delivery of new modalities
  - Chief Chemist on AZ's R&D leadership team
- **Enjoys the opportunity to impact global and public health through innovative medicines**
  - Publishes on a regular basis, pharmaceutical and behavioral sciences
- **Passionate volunteer in AAPS, ACS, GRC and others**
  - Serves on the AAPS Executive Council as a board member
  - Contributing to the scientific and professional development of the wider community
- **Contact:** [annette.bak@astrazeneca.com](mailto:annette.bak@astrazeneca.com), LinkedIn, Facebook, Twitter

## Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



**How many women chemists in drug discovery or development do you know of?**

- I only know four (Annette, Erika, Donna, and Nurulain)
- I know around ten or less
- I know more than ten but less than twenty-five
- I know between twenty-five and fifty
- I know more than fifty

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### Erika Vieira Araujo



Senior Research Investigator  
Oncology Drug Discovery, Bristol-Myers Squibb

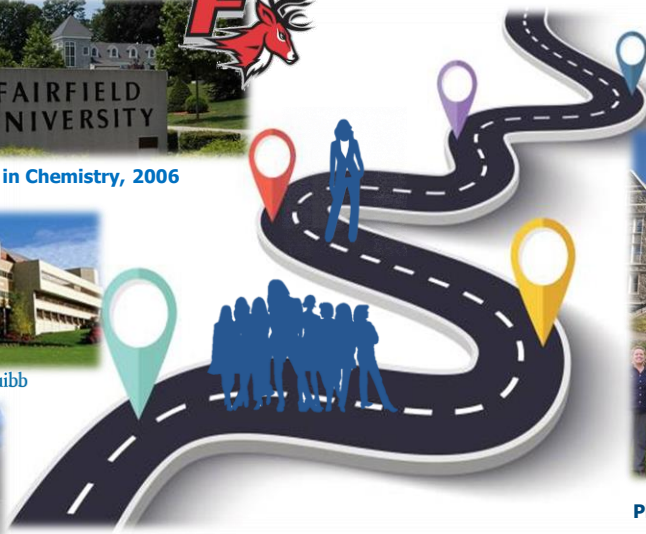
## Erika Vieira Araujo



B.S. in Chemistry, 2006



Bristol-Myers Squibb



Ph.D. in Organic Chemistry, 2013

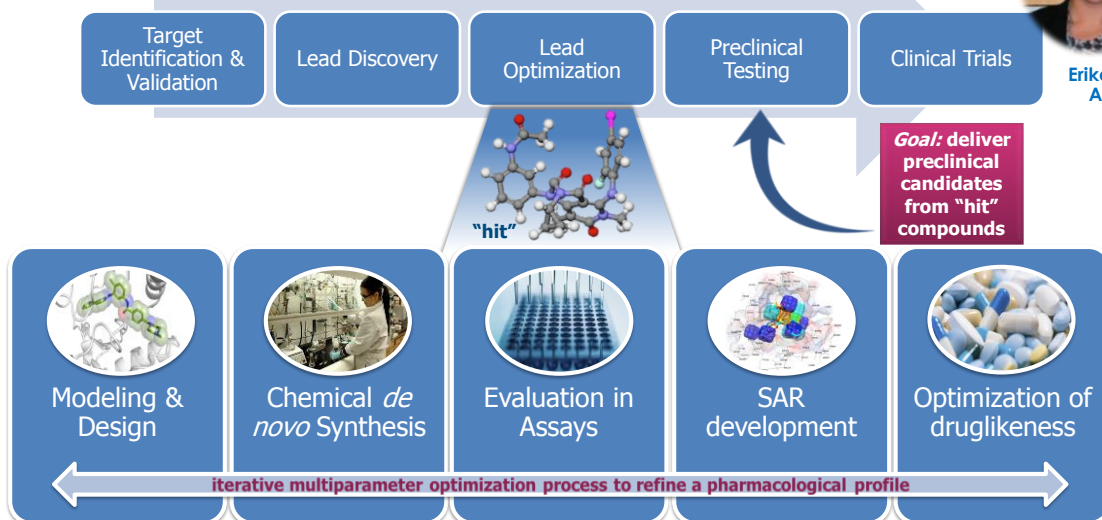
Bristol-Myers Squibb

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## Drug Discovery and Lead Optimization Overview



Erika Vieira Araujo



Angew. Chem. Int. Ed. 2001 40, 3341

Bristol-Myers Squibb

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# Skills that make a good medicinal chemist



Erika Vieira Araujo



Highly Analytical & Data-Driven  
Problem Solver  
Creative



Good communication  
Team player  
Build a network of connections



Learn about what interests you  
Be confident!!  
Good support system

# Lessons learned...so far



Erika Vieira Araujo



Find your passion, become an "expert" in an area of interest and never stop learning



Do not be humble to a fault—know when to speak up and how to highlight your accomplishments



HIDDEN BRAIN A CONVERSATION ABOUT LIFE'S UNSEEN PATTERNS  
[How Stereotypes Can Drive Women to Leave Science](#)

## Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



### Have you participated in these activities that focus on gender differences in science?

- I have read a book that focuses on gender differences in science
- I have attended a lecture that focuses on gender differences in science
- I have both read a book and attended a lecture that focuses on gender
- I have neither read a book nor attended a lecture that focuses on gender differences in science

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## Donna M. Huryn



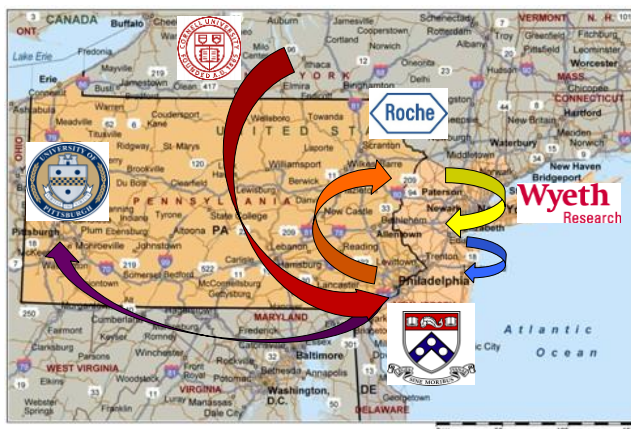
Research Professor, Department of Pharmaceutical Sciences and Principal Investigator, Chemical Diversity Center, University of Pittsburgh and Associate Editor, *ACS Medicinal Chemistry Letters*



## Donna M. Huryn



Nearly 30 years of Adventures, Across 3 States!



- **Education**
  - B.A. Chemistry – Cornell University
  - Ph.D. Organic Chemistry – University of Pennsylvania
- **Pharma Career**
  - Hoffmann-La Roche – Medicinal Chemistry Group/ Project Leader
    - Drugs for HIV, Cancer, Inflammation
  - Wyeth Research – Medicinal Chemistry & Chemical Sciences / Director
    - Drugs for Alzheimer's Disease, depression, schizophrenia
    - Transition between discovery & development
- **Academic Career**
  - University of Pittsburgh – School of Pharmacy
    - Research Professor
  - University of Pennsylvania- Department of Chemistry
    - Adjunct Faculty



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## Currently...



Donna M. Huryn



### Faculty at University of Pittsburgh School of Pharmacy

- Teaching responsibilities
- Research activities:
  - Medicinal chemistry directed towards finding innovative treatment for Cancer & Kidney Disease

### University of Pennsylvania Department of Chemistry

- Teaching responsibilities
- Collaborative research projects: Neurodegenerative Disease
- Tools for medicinal chemists



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## Other...



Donna M. Hury



- **ACS Med Chem Letters**
  - Associate Editor
- **Organic Letters**
  - Editorial Advisory Board
- **ACS Division of Organic Chemistry**
  - Councilor
  - Chair
- **NIH Panels**
- **Community Volunteer**



## Medicinal Chemistry Baseline: Technical Skills



Donna M. Hury



### Baseline: Technical Skills

- Strong organic chemistry background
  - Synthesis
  - Analytical chemistry
  - Purification chemistry
- Some familiarity with biochemistry

### To Excel: Soft Skills

- Strong verbal and written communication
- Ability to work with diverse people, within diverse cultures, among various disciplines
- Flexibility
- Adventurousness

## What's it like to be a women in Med Chem?

ACS Medicinal  
Chemistry Letters

Viewpoint

pubs.acs.org/acsmchemlett



Donna M. Huryn

### Medicinal Chemistry: Where Are All the Women?

Donna M. Huryn,<sup>\*,†</sup> Maria Laura Bolognesi,<sup>\*,‡</sup> and Wendy B. Young<sup>\*,§</sup>

<sup>†</sup>Department of Pharmaceutical Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania 15260 United States

<sup>‡</sup>Department of Pharmacy and Biotechnology University of Bologna, Bologna, Italy

<sup>§</sup>Discovery Chemistry, Genentech, Inc., South San Francisco, California 94080, United States

**ABSTRACT:** A review of multiple parameters including membership in professional organizations, corresponding authorship of medicinal chemistry journal articles, and representation in professional and leadership positions reveals that the percentage of women who participate in professional medicinal chemistry activities is less than 20%. These surrogate demographics are consistent across organizations, regions in the world and the various parameters evaluated, and parallel statistics compiled on the broader participation of women in all STEM fields. As in other STEM fields, a leaky pipeline is also evident. Suggestions for how to encourage and support women in medicinal chemistry in order to provide a more balanced representation are provided.

**KEYWORDS:** Medicinal chemistry, careers, women in science, women in STEM, leaky pipeline

[ACS Med. Chem. Lett. 8, 9, 900-902](#)

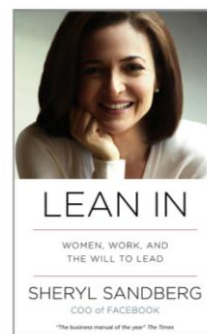
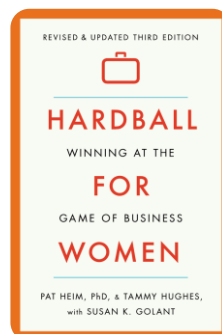


## How to Succeed



Donna M. Huryn

- Find / surround yourself with good mentors, supportive people
- Ask for what you need to succeed
- Read up on gender differences – know yourself
  - Pat Heim: [Hardball for Women](#)
  - Sheryl Sandberg: [Lean In](#)



## Take Home Message



Donna M. Huryn

- **Great profession** - Many important problems to solve
- **Some positions / opportunities outside of your “job”** are as important as those in it
- **Balancing professional and personal life takes work** - don't be afraid to make tough choices / don't regret



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### Audience Challenge Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



**If you have the technical skills necessary for a job in drug discovery and development what is next most valued?**

- Soft skills
- Networking and connections
- Serendipity
- Other (and if so what, type it in the chat!)

## Nurulain Zaveri



Founder, President, Chief Scientific Officer, and Principal Investigator,  
Astraea Therapeutics

## Nurulain Zaveri

### Education and Career



**Bachelor of Pharmacy**  
Bombay Univ. Dept of Chemical  
Technology (UDCT), India

**Pfizer India**  
Quality Control and  
Assurance Trainee (1-year)



**Ph.D. Medicinal Chemistry**  
Duquesne University, Pittsburgh, PA



**Postdoctoral Research**  
Stanford Research Institute (SRI Intl)  
(non-profit, non-academic)



**SRI International (16-years)**  
Principal Investigator, Project Leader  
Director of Drug Discovery Program

**Astraea Therapeutics (2009-Current)**  
Founder, President, Chief Scientific  
Officer, Principal Investigator



## Also Important to My Career



Nurulain Zaveri



- Member—Professional organizations such as the **American Chemical Society** and the **American Association of Pharmaceutical Scientists (AAPS)**
  - 30-year member of ACS (since second year grad school)(1987-present)
  - Active volunteer at AAPS (1988-present), Chair of Drug Discovery and Development section
- AAPS Fellow
- Active Grant reviewer for NIH, American Foundation for Pharmaceutical Education
- **More important**— is to contribute/give your time and expertise to the scientific community of which you are a part.



*Participate, Contribute, Volunteer, Benefit*

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## Currently...

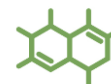


Nurulain Zaveri



### *As President of Astraea, my responsibilities are:*

- To advance the development of our **drug candidate pipeline**
- To bring in and sustain my **company's funding**
- To provide a **motivating, stimulating environment** at Astraea
- Deliver on our mission of '**Discoveries for Better Health**'.



### *As Chief Scientific Officer, my responsibilities are:*

- Principal Investigator
- Direct, guide, brainstorm
- Drug design, medicinal chemistry, synthetic chemistry, in vitro pharmacology, collaborations, CRO liaison for preclinical development (**the fun stuff**)



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## My day...



Nurulain Zaveri



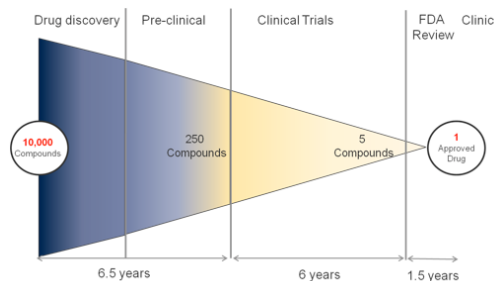
- **Never same day to day**
- **I could be**
  - working on writing a grant
  - thinking of structure-activity relationships or druggability profiles
  - contemplating in vivo data from a collaborator or CRO
  - discussing chemistry or pharmacology results in the lab
  - working on a manuscript
  - business development

## Technical and Soft Skills



Nurulain Zaveri

- Strong background and foundation in pharmaceutical and medicinal chemistry from both my pharmacy background and medicinal chemistry PhD
- This included drug pharmacology, biochemistry, and pharmaceutical chemistry
- Familiarize yourself with aspects of Pharmaceutical Development outside of your specific training



Be curious, never complacent, because as pharmaceutical scientists, we still have many important unmet health questions to solve

## Take Home Message



Nurulain Zaveri



- Work for someone whom **YOU** can respect and who respects you
- **Professional and mutual respect** is the 'fertilizer' for career growth
- **Be open about sharing career experiences**, it is a form of passive mentoring
- **Be that mentor** that the younger generation is looking for

*Astraea*  
Therapeutics

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in Drug Discovery and Development

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  -  Long-Acting Injectable Medications: Strategies and Mechanisms Considerations: James Remar - Alkermat; Anthony Bai - Merck
  -  Modified Release Formulations for Solubility Starved Compounds: Mergues Hu - Merck; John Mariani - BMS
  -  The Medicinal Chemistry of Tamoxifen (Special Topic): Joe Barish - Jubilant; Raji Nagend - Merck; Nitin Sood - Team Case Angler
- II - Beyond Traditional Small Molecules**
  -  Design of Deliverable Macromolecules: Scott Loney - UC Santa Cruz; Nicholas Meanwell - BMS
  -  Drawing Big and Thinking Small: Applying Medicinal Chemistry Strategy to Antibody-Drug Conjugates: L. Nathan Tully - Pfizer; Peter Senter - Genentech
  -  Nucleic Acids Therapeutics: Making Sense of Antisense Oligonucleotides: Paul Scharf - Genentech; Richard Dixon - BMS
  -  Crystallography as a Drug Design and Delivery Tool (Special Topic): Robert Kamlesh - Crystal Pharmachem; Vincent Sait - Abbvie; Andrew Brunzell - Merck
- III - Pharmacology Revisited**
  -  Dealing with Reactive Drug Metabolites in Drug Discovery: Can We Predict Toxicities of Drug Candidates that Form Reactive Metabolites?: Deenan Dairis - Pfizer; Research Paper Exchange - Vanderbilt University
  -  Rational Design of Small Molecules Targeting RNA: Matt Dineley - Corcept Bi-Pharma; America Garner - University of Michigan
  -  Cell Penetrating Peptides to Improve Cellular Drug Uptake: Dennis De - The Ohio State University; Scott Hahn - Bristol-Myers Squibb

## 2017

- I - Fighting Cancer**
  -  Fighting Cancer: Targeting CNS Malignancy with Kinase Inhibitors: Timothy S. Ashton - Genentech; Mark Wiseman - Bristol-Myers Squibb
  -  Fighting Cancer: Epigenetic targets for Oncology: Stuart Conway - Oxford; Shawn Sagar - AstraZeneca
  -  Fighting Cancer: Allosyl and Targeting Cancer Cell Metabolism: Stefan Gross - Agost; Scott Edmonston - AstraZeneca
- Special Broadcast**
  -  Cystic Fibrosis: Discovery of CFTR Modulators: Peter Grotenhuis - Vertex; Nick Meanwell - Bristol-Myers Squibb
- II - Anti-infectives**
  -  Anti-infectives: Rational Approaches to the Design and Optimization: Jason Selis - Brown University; Courtney Aldrich - University of Minnesota
  -  Tuberculosis: An Introduction for Medicinal Chemists: Carl Nathan - Wellcome Medicine; Christopher Boyle - Merck
  -  Viral Hepatitis: The Search for a Cure: Mike Sofia - Amicus Biopharma; Stephen Mason - GlaxoSmithKline
- Special Broadcast**
  -  Social Molecular Biology: Kevin Hodgson - Harvard Medical School; Alyson Waldmann - ACS Publications
- III - Immunology**
  -  Precision: Treatment and Novel Approaches: Frank Nispe - Amgen; John Morrison - Bristol-Myers Squibb
  -  Lupus: Treatment and Novel Approaches: Laurence Mearns - Bristol-Myers Squibb; Mary Southern - Bristol-Myers Squibb

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Co-produced with the ACS Division of Chemical Health and Safety and the ACS Committee of Chemical Safety

Experts



Ralph Stuart  
Keene State College



Samuella Sigmann  
Appalachian State University



Thursday, April 5, 2018

### Creating New Models to Combat Neglected Disease Through, Industry, Government, and Public-Private Partnerships

Co-produced with the ACS Infectious Diseases

Experts



Michael Pollastrri  
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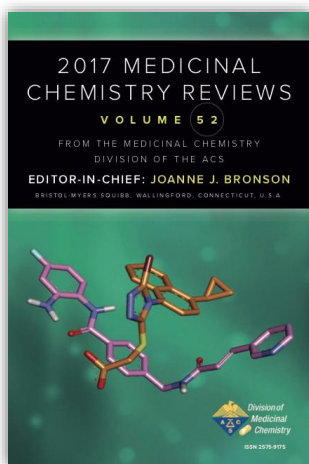


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