

**Gregory John Mehos, Ph.D., P.E.**  
**4 Crusade Road, Westford, Massachusetts 01886**  
**978-799-7311 (mobile)**

gmehos@uri.edu • greg@mehos.net • <https://www.linkedin.com/in/gmehos> • [www.mehos.net](http://www.mehos.net)

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## **PROFESSIONAL PROFILE**

Chemical engineer with extensive experience in bulk solids handling and processing. Provided solutions to powder handling problems and recommended bulk solids handling equipment for clients in the pharmaceutical, chemical, glass, biotechnology, lithium-ion battery, plastics, food, and powdered metal industries. Expertise includes drying, fluidizing, feeding, dispersing, conveying, storage, extrusion, reacting, blending, granulating, and testing. Expert on handling and processing challenging materials such as carbon black and fumed silica. Professional experience includes manufacturing, research and development, consulting, and training. Spray drying knowledge includes bench, laboratory, pilot, and commercial equipment. Author of subsection on powder flow and hopper and chute design in Perry's Chemical Engineers' Handbook, 9<sup>th</sup> edition. Licensed Professional Engineer. American Institute of Chemical Engineers Fellow.

## **QUALIFICATION SUMMARY**

### Powder handling and processing

- Designed hoppers, bins, silos, transfer chutes, granulators, and feeders for handling bulk materials handled in the chemicals, energy, pharmaceuticals, biomass, and plastics industries.
- Optimized flow properties of pharmaceutical formulations.
- Determined causes of caking of pharmaceutical and food powders and provided remedies.
- Developed patented air-assisted hopper for handling powdered metals.
- Designed extension hopper that prevents compaction of powder in gravimetric feeder so that desired powder discharge rate is maintained during filling cycle.
- Designed innovative moving bed reactors, heaters, and dryers for processing powders.
- Designed, fabricated, and installed moving bed conditioner for removing static charge from powders.
- Designed bins and feeders for handling lithium-ion battery anode and cathode powders.

### Process development

- Developed and implemented continuous granulation process at contract manufacturing organization (CMO).
- Designed and implemented pilot plant process for surface modification of fine particles.
- Designed moving bed induction heater process for manufacturing highly conductive grades of carbon black.
- Designed, fabricated, and installed moving bed conditioner for preventing static charge of powders.
- Co-inventor of continuous solvent-free process for removing cannabinoids from cannabis.
- Scaled up spray dryer based process for attaching polymers onto inkjet pigments, key accomplishment in the launch of new products for printing companies.
- Designed and implemented pilot plant process for surface modification of fine particles.
- Reduced the cost of spray drying at toll manufacturer by stretching capacity of existing process equipment.

### Project management

- As project engineer, managed testing programs and designed or recommended equipment for storage, handling, and processing of bulk solids.
- Executed research and development activities through stage-gate process.
- Evaluated CMO (contract manufacturing organization) options and managed projects at selected organizations.

### Spray drying

- Managed pilot plant for scaling up spray drying processes for isolating emulsified solids.
- Established operating conditions for Buchi, GEA/Niro, and Roberts Box spray dryers with evaporative capacities ranging from 1 – 1,000 kg/hr.
- Developed novel method for improving flowability of spray-dried powders.
- Stretched capacity of existing commercial spray dryer by 40 percent.

## Materials science

- Established testing laboratory for measuring fundamental flow properties of bulk solids.
- Evaluated and authored operating procedures for Schulze, Peschl, Brookfield, and Freeman shear cell testers.
- Fabricated bulk solids permeability and wall friction testers.
- Interpreted inverse gas chromatography (surface energy) and sorption test results.

## **PROFESSIONAL EXPERIENCE**

GREG MEHOS & ASSOCIATES LLC, WESTFORD, MASSACHUSETTS

*Greg Mehos & Associates (www.mehos.net) provides consulting, testing, and training services related to bulk solids handling and processing. 2017 – present.*

JENIKE & JOHANSON, INC., TYNGSBORO, MASSACHUSETTS

*Jenike & Johanson is a material testing and engineering consulting company that specializes in the storage, handling, and processing of bulk solids.*

- Senior Project Engineer, 2014 – 2017
- Project Engineer, 2006 – 2011

CABOT CORPORATION, BILLERICA, MASSACHUSETTS

*Cabot is a specialty chemical company that manufactures fine particles and inkjet colorants.*

- Lead Engineer, 2011 – 2014
- Senior Process Development Engineer, 1996 – 2006

ROHM AND HAAS COMPANY, BRISTOL, PENNSYLVANIA

*Rohm and Haas is a specialty chemical company that produces acrylic monomers and polymers, ion exchange resins, and agricultural products. It is now wholly owned by the Dow Chemical Company.*

- Senior Process Development Engineer, 1992 – 1996
- Process Development Engineer, 1989 – 1992

MASSACHUSETTS INSTITUTE OF TECHNOLOGY SCHOOL OF CHEMICAL ENGINEERING PRACTICE ALBANY STATION, ALBANY, NEW YORK, BOULDER, COLORADO, AND CAMBRIDGE, MASSACHUSETTS

*The MIT Practice School is a program in which chemical engineering graduate students work on projects at host companies (GE Silicones, Waterford, NY, GE plastics, Selkirk, NY, Syntex Chemicals, Boulder, CO) in lieu of a master's thesis.*

- Director and Assistant Professor, 1987 – 1989
- Assistant Director, 1986 – 1987

UNIVERSITY OF RHODE ISLAND DEPARTMENT OF CHEMICAL ENGINEERING, KINGSTON, RHODE ISLAND

- Adjunct Professor, 2012 – present

## **PROFESSIONAL AFFILIATIONS**

- American Institute of Chemical Engineers Fellow; past Chair, Boston local section; past Executive Committee Member, Particle Technology Forum
- Institute for Briquetting and Agglomeration, Member, Board of Directors
- Licensed Professional Engineer, Massachusetts

## **EDUCATION**

- Ph.D. (Chemical Engineering), University of Colorado
- M.Ch.E., University of Delaware
- B.S.Ch.E., University of Colorado, special honors

## **SELECTED PUBLICATIONS**

Mehos, G., “Design of Extension Hoppers for Gravimetric Feeders”, *Processing*, 36, 11 (2023).

Mehos, G. and S. Miller, “Reliable Flow of Titanium Powders from Bins and Hoppers”, presented at the 15th World Conference on Titanium (Ti-2023), Edinburgh, June 2023.

Mehos, G., S. Miller, and A. Godfrey, “Improving in Powder Flowability by Spheronizing”, presented at the 37<sup>th</sup> annual Institute for Briquetting and Agglomeration biennial conference, Denver, CO, September 2022.

Mehos, G. and D. Patel, "Optimization of Oral Dosage Forms for Roller Compaction", presented at the 37<sup>th</sup> annual Institute for Briquetting and Agglomeration biennial conference, Denver, CO, September 2022.

Mehos, G., "Maximum Solids Discharge Rates from Hoppers", *Chem. Engr. Res. Des.*, 191, 564 (2023).

Mehos, G., "Design of Bulk Solids Moving Bed Heat Exchangers", *Chem. Engr.* 127. 11, 28 (Nov. 2020).

Mehos, G., "Using Solids Flow Properties to Design Mass- and Funnel-Flow Hoppers", *PBE.*, 34, 2 (Feb. 2020).

Mehos, G., "Choosing Agglomeration Technologies", *Powder Bulk Engr.*, 34, 1(Jan. 2020).

Mehos, G., "Using Powder Pumps in Wet Agglomeration Processes", *Powder Bulk Engr.*, 33, 1, 72 (Jan. 2019).

Mehos, G. and J. Carson, "Bulk Solids Flow and Hopper Design", subsection in Perry's Chemical Engineers' Handbook, 9<sup>th</sup> edition, McGraw-Hill, New York, 2018.

Mehos, G., "Designing Hoppers, Bins, and Silos for Reliable Flow", *Chem. Engr. Progress*, 114, 4 (Apr. 2018).

Mehos, G. and S. McClory, "Gravimetric Feeders: The Achilles' Heel of Continuous Manufacturing", *Powder Bulk Solids*, 33, 4 (Apr. 2018).

Mehos, G. and C. Kozicki, "Choosing Agglomeration Processes", *Chem. Engr.*, 127, 8, 51 (Oct. 2017).

Mehos, G., M. Eggleston, T. Trautman, M. Freeman, N. Stevens-Murphy, "Using Fundamental Powder Properties to Optimize the Flowability of Formulations", *Tablets & Capsules*, 15, 7, 11 (Oct. 2017).

Mehos, G., "Prevent Caking of Bulk Solids", *Chem. Eng. Progress*, 112, 4 (Apr. 2016).

Mehos, G., and D. Morgan, "Hopper Design Principles", *Chem. Eng.*, 126, 1 (Jan. 2016).

Mehos, Gregory J., Feed Considerations for Continuous Dryers", *Pharm. Processing*, Jul./Aug. 2014, pp. 24-25.

Mehos, G., A. Boroch, and C. Wykoff, "Using an Air-Assisted Discharge Hopper to Eliminate Powder Flow Problems", *Powder Bulk Eng.*, 27, 11 (Nov. 2013).

Mehos, G. and C. Kozicki, "Improving the Flow of Powders by Agglomeration", presented at the 32<sup>nd</sup> biennial Institute of Briquetting and Agglomeration Conference, New Orleans, Sept. 26, 2011 (*Winner of the Neal Rice Award for best paper and presentation*).

Mehos, G. and J. Paternina, "Design Considerations for Bulk Solids Gravity Flow Processing Vessels", presented at ChemInnovations, Houston, Sept. 13, 2011.

Mehos, G., "Designing Dust Collectors", *Chem. Eng. Progress*, 107, 9 (Sept. 2011).

Mehos, G. and C. Kozicki, "Consider Wet Agglomeration to Improve Powder Flow", *Chem. Eng.*, 121, 11 (Jan. 2011).

Hartford, C., G. Mehos, and S. Clement, "Caking Problems in Candy Manufacturing", *Manuf. Confect.*, 90, 12, 77 (Dec. 2010).

Mehos, G. and E. Maynard, "Handle Bulk Solids Safely and Effectively", *Chem. Eng. Progress*, 105, 9, 38 (Sept. 2009).

Mehos, G., "Designing and Operating Gravity Dryers", *Chem. Eng.*, 116, 5, 34 (May 2009).

Mehos, G., "Modifying Your Storage Vessel for Trouble-Free Continuous Purging or Conditioning", *Powd. Bulk Eng.*, 21 (Nov. 2008) and 22 (Dec. 2008).

Jacobs, K. and G. Mehos, "The Importance of Using Limiting Flow Rates to Assess the Flowability of Pharmaceuticals, Excipients and Their Mixtures", presented at AIChE 2008 Annual Meeting, Philadelphia, PA, Nov. 17, 2009.

Mehos, G. and S. Clement, "Prevent Caking and Unwanted Agglomeration", *Chem. Eng.*, 115, 8, 55 (Aug. 2008).

Ennis, B. and G. Mehos, "Characterizing the Impact of Flow Aids on the Flowability of Pharmaceutical Excipients by Automated Shear Cell", presented at AAPS 2004 Annual Meeting, Baltimore, MD, Nov. 10, 2004.

## PATENTS

Mehos, G. and A. Boroch, "Mass Flow Hopper", U.S. Patent No. 11,325,776B1 (May 10, 2022).

Sherwood, R., S. Sherwood, C. Cullimore, and G. Mehos, "Systems, Methods, and Equipment for Chemical Extraction", U.S. Patent No. 10,765,965 B1 (September 8, 2020).

Mahmud, K, J. Belmont, James A, Y. Kutsovsky, W. Devonport, M. Wang, C. Galloway, and G. Mehos, "Polymers Containing Modified Pigments and Methods of Preparing the Same", U.S. Patent No. 6534569 (April 13, 2003).

Mehos, G. and H. Tu, "Methods for Preparing Silica-coated Carbon Products", U.S. Patent No. 6541113 (April 1, 2003).