



## M. Teresa Carvajal

Ph.D. University of Bath - 2001

### Faculty Fellow

Faculty Award of Excellence – Team Award, Pharmaceutical Engineering Research ERC – 2010  
Showalter Award - 2008

### Research Areas:

Surface Science of Pharmaceutical, Food and Agricultural Materials - by exploring of and exploiting physical and chemical properties to take advantage of their full potential hence understand, control, manipulate particle interactions, cohesion-adhesion. Materials Surface Characterization.

### Selected Publications:

- Zhang, Y. and **Carvajal MT**. Effect of dehydration conditions on the bulk and surface properties of the resulting dehydrated products. Food Preservation Technology Series: *Water Properties of Food, Pharmaceuticals and Biological Materials*. In Press (2014).
- Feng T, Stanciu L, **Carvajal MT**. Making sense of milling : The role of water on the micro-structural relaxation of griseofulvin. *Water Journal Accepted*. (2013)
- Lei Lei, **M.Teresa Carvajal** and Marisol Koslowski. Defect-induced solid state amorphization of molecular crystals. <http://dx.doi.org/10.1063/1.3698500> (8 pages) J. Appl. Phys. 111, 073505 (2012).
- Kevin Macias and **M.T. Carvajal**. The influence of granule density on granule strength and resulting compact strength. *Chemical Engineering Science* 72: 205–213 (2012).
- Andrew Otte, Yan Zhang, **M.Teresa Carvajal** and Rodolfo Pinal. Milling Induces Disorder in Crystalline Griseofulvin and Order in its Amorphous Counterpart. *CrystEngComm* 14:2560-2570 (2012).
- Yuanyuan Jing, Yan Zhang, John Blendell, Marisol Koslowski, and **M. Teresa Carvajal**. A nano-indentation method to study slip planes in molecular crystals in a systematic manner. *Crystal Growth & Design*, 11 (12):5260–5267 (2011).
- Takanori Ito, Stephen Byrn, Xin Chen, **M. Teresa Carvajal**. Thermal insight of mechanically activated bile acid powders. *International Journal of Pharmaceutics International Journal of Pharmaceutics* 420(1):68-75 (2011).
- David R. Ely, **M. Teresa Carvajal**. Determination of the Scale of Segregation of Low Dose Tablets Using Hyperspectral Imaging. *International Journal of Pharmaceutics* 414 157– 160 (2011).
- Andrew Otte and **M. T. Carvajal**. Assessment of Milling-Induced Disorder of Two Pharmaceutical Compounds. *Journal of Pharmaceutical Sciences* 100: 1793-1804 (2011).
- N. S. Trasi, S. X. M. Boerrigter, S. R. Byrn and **M. T. Carvajal**. Investigating the effect of dehydration conditions on the compactability of glucose. *International Journal of Pharmaceutics* 406: 55-61 (2011).
- M. Yamauchi, E. H. Lee, A. Otte, S. R. Byrn and **M. T. Carvajal**. Contrasting the Surface and Bulk Properties of Anhydrate and Dehydrated Hydrate Materials. *Crystal Growth & Design* 11: 692-698 (2011).
- M. N. Slipchenko, H. T. Chen, D. R. Ely, Y. Jung, **M. T. Carvajal** and J. X. Cheng. Vibrational imaging of tablets by epi-detected stimulated Raman scattering microscopy. *Analyst* 135: 2613-2619 (2010).
- Mohamad G. Abiad , David C. Gonzalez, Behic Mertb, Osvaldo H. Campanella and **M Teresa Carvajal**. A Novel Method to Measure the Glass and Melting Transitions of Pharmaceutical Powders. *Int. J. Pharm.* 396:23-29 (2010).
- Sylvia Swandono, Andrew Otte and **M. Teresa Carvajal**. Measuring particle adhesive ability. *Inhalation* 4(4):12-15 (2010).
- Sai Prasanth Chamarthy, Nawel Khalef, Niraj Trasi, Aziz Bakri, **M. Teresa Carvajal** and Rodolfo Pinal. The effect of dehydration conditions on the functionality of anhydrous amorphous raffinose. *Eur J Pharm Sci* 40(3):171- 178 (2010).
- Mohamad G. Abiad, Osvaldo. H. Campanella and **M Teresa Carvajal**. Assessment of thermal transitions by dynamic mechanical analysis (DMA) using a novel disposable powder holder. *Pharmaceutics* 2(2), 78-90 (2010).

Sai P. Chamarthy, Rodolfo Pinal and **M. Teresa Carvajal**.

Elucidating Raw Material Variability—Importance of Surface Properties and Functionality in Pharmaceutical Powders. *AAPS PharmSciTech*. 10:780-788 (2009).

M. Abiad, **M.T. Carvajal** and O. Campanella. A review on methods and theories to describe the glass transition phenomenon: applications in food and pharmaceutical products. *Food Eng Rev* DOI 10.1007/s12393-009-9009-1 (2009).

Aurélie Barth, Ziyang Su, Karl Wood, Stephen R. Byrn and **M. Teresa Carvajal**. Counterfeit Medication Determination via Impurity Mapping. *Tablets and Capsules* 7(7): 24-29 (2009).

Tao Feng, Simon Bates and **M. Teresa Carvajal**. Toward Understanding the Crystal Defects Formation and Evolution during the Cryogenic Milling of Griseofulvin. *Int. J. Pharm.* 367(1-2):16-19 (2009).

Vidya Joshi, Kenneth R. Morris, Stephen R. Byrn and **M. Teresa Carvajal** Evaluation of the Use of Ea (Activation Energy) as a Quantitative Indicator of Physical Stability of Indomethacin Solvates: Methanolate and Tertiary Butyl Alcohol Solvate. *Cryst. Growth*, 9 (8), pp 3359–3366 (2009).

Yinyan Zhao, Fuyue Li, **M. Teresa Carvajal**, Michael T. Harris. Interactions between bovine serum albumin and alginate: An evaluation of alginate as a protein encapsulation carrier. *Journal of Colloid and Interface Science* 332(2):345-353 (2009).

### Patents:

Markus Thommes, Rodolfo Pinal, **M. Teresa Carvajal**. Solid formulations of crystalline compounds. Patent Appl No. 20100222311 (Sept 2010).

### Selected Presentations:

Real-Time Particle Dispersion from a DPI Using Image Velocimetry: Evaluation of Powder Adhesion, Impact and Collision. SES Annual Technical Meeting - Section on Pharmaceutical solids: Synthesis, Manufacturing, Characterization and Modeling. October 1-3, 2014, Purdue University.

Pharmaceutical and Food Surfaces of Relevant Composite Materials and the Characterization Thereof. SES Annual Technical Meeting, Section on Pharmaceutical solids: Synthesis, Manufacturing, Characterization and Modeling. October 1-3, 2014, Purdue University.

Particulate and Powder Characterization: Surface and Mechanical Properties. Pharmaceutical Technology Course, Universidad de los Andes, Bogota, Colombia, July 2014.

La importancia del estado sólido en la formulación de medicamentos farmacéuticos. Curso CANIFARMA, March 20, 2014, Mexico City, Mexico.

Structural Diversity and Micro-Structural Evolution of Pharmaceutical Relevant Materials after Mechanical Activation. Simposio UNAM- Cuatitlan, 18-19, March, 2014, Mexico City, Mexico.

Micro-fabrication of Particles for Inhalation and Characterization Thereof. International Workshop on Physical Characterization of Pharmaceutical Solids Barcelona, Spain. June, 2012.

Unraveling API Material Properties for Prediction and Control of Product Performance. Center for Pharmaceutical Processing Research (CPPR) meeting at UConn, Storrs, CT, May 2012.

Exploring and exploiting physical properties of molecular crystals subjected to mechanical milling. TMS (The Minerals, Metals and Materials Society) 2012 Linking Science and Technology for Global Solutions, conference in Orlando, FL. March 2012.