DORA ILIANA MEDINA

Massachusetts Institute of Technology
Department of Mechanical Engineering
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Present	Postdoctoral Fellow, Mechanical Engineering, **Massachusetts Institute of Technology (MIT)** Cambridge, MA, USA. Hatsopoulos Microfluids Laboratory (HML)
2009	PhD, Chemical Engineering, **University of Cambridge** Cambridge, UK, *Thesis: The development of microcapillary films and microcapillary monolith structures to produce controlled capillary diameters and voidage.*
2005	MS, Chemical and Environmental Engineering, **University of California** CA, USA, *Thesis: High-silica-zeolite BEA Spin-on Low-k Dielectric Films for Future Generation Computer Chips*
2000	BS, Chemical Engineering,*(Polymers)* **Instituto Politécnico Nacional** Mexico City, Mexico *(GPA: 9.54 out of 10.00)* Graduated: with Honors. *Thesis: Fabrication of Acrylic Sheets with High Impact Resistance*
1994	Computer Programming Technical Degree, CBTIS Tamaulipas, Mexico, *(GPA 9.98 out of 10.00)*

Publications

Li S.; Li ZJ.; Medina D.; Lew C. and Yan YS. **2005**. Organic-Functionalized Pure-Silica-Zeolite MFI Low-k Films, ***Chem. Mater.*** 17:1851-1854.

Li, Z.; Lew, C.M.; Li, S.; Medina, D.I. and Yan YS. **2005**. Pure-Silica-Zeolite MEL Low-k Films from Nanoparticle Suspensions, ***J. Phys. Chem. B***. *109*:8652-8658.

Medina, D.I., Z.J. Li, and Y.S. Yan. **2005**. Nanocrystalline zeolite beta film as a low-k material. Abstracts of Papers of the American Chemical Society, **2005**. **229**: p. U913-U913.

Mackley M.R., Hallmark B., Hornung C.H and Medina D.I. **2007**. The Invention and Innovation of a Novel Plastic Microcapillary Film Technology, IChemE Awards 2007.

Medina, D.I., Hallmark, B., Mackley, M.R.,, **2008**. Using hollow microcapillaries to explore the extrusion rheology of polymer films, AIP - Proceedings of the American Institute of Physics, **1027**: 54-56

Lew, C.M , Li, Z.; Li, S.; Hwang S.; Liu Y.; Medina, D.I.; Sun M.; Wang J.; Davis M.E. and Yan YS. **2008**. Pure-Silica-Zeolite MFI and MEL Low-Dielectric Constant Films with Fluoroorganic Functionalization, ***Adv. Func. Mater***, 18(21):3454-3460.

Medina D.I, Hallmark B., Lord T.D, Mackley M.R. **2008**. The development of voidage and capillary size within extruded plastic films. ***Journal of Mat Sci***. **43**(15): 5211-5221.

Medina D.I, Chinesta F. and Mackley M.R. **2009**. Heat Melding of Voided Polyethylene Microstructures. ***Polymer***, 50(14): 3302-3310.

Presentations

D.I. Medina, **2010**. The development of microcapillary films and microcapillary monolith structures to produce controlled capillary diameters and voidage, January, 2010. ITAM, Mexico City, Mexico.
D.I. Medina, B. Hallmark, M.R. Mackley, **2008**. Using hollow microcapillaries to explore the extrusion rheology of polymer films, The XVth International Congress on Rheology, August 3 - 8, 2008, Monterey, California.
D.I. Medina, B. Hallmark, T.D. Lord, M.R. Mackley, **2008**. The development of voidage and capillary size within extruded plastic films, *Keynote Presentation*, 24th Annual Meeting of the Polymer Processing Society, 15-19 June 2008, Salerno, Italy.

D.I. Medina and M.R. Mackley, **2007.** Putting holes into plastic films, Robinson College MCR/SCR Research Day, October 27 2007, University of Cambridge, Cambridge, UK.
D.I. Medina and M.R. Mackley, **2007.** Ultra high voidage Microcapillary films. University of California Los Angeles - Eric M.V. Hoek Research Group, The California NanoSystems Institute, UCLA, August 17, 2007, Los Angeles, California, USA.
D.I. Medina and M.R. Mackley. **2007**. Plastic Microcapillary films. 5th Symposium of Mexican Students and Studies, June 29-30 2007, University of Sussex, Brighton, U.K.
D.I. Medina and M.R. Mackley. **2006**. The evaluation of microcapillary films and microcapillary monoliths. "Structure Sensitive Mechanics of Polymer Materials: Physical and Mechanical Aspects", EUROMECH Colloquium 487, European Mechanics Society, October 10-13, 2006, Strasbourg, France.
D.I. Medina and M.R. Mackley. **2006**. The evaluation of microcapillary films and microcapillary monoliths. 112th International Summer Course BASF Aktiengesellschaft, August 28-Sept 09, 2006, BASF Aktiengesellschaft, Ludwigshafen, Germany.
D.I. Medina and Y. Yan. **2005**. Zeolite Low-k Dielectric Films. California Technological Institute – M. E. Davis Research Group, May 15, 2005, Pasadena, California, USA.
D.I. Medina, Z. Li, S. Li and Y. Yan. **2005**. High-silica-zeolite BEA Spin-on Low-k Films. American Chemical Society 229th National Meeting, March 13-17, 2005, San Diego, California, USA.
D.I. Medina and Y. Yan. **2004**. Nanocrystalline zeolite Beta film as a low-k material, UCR CEE annual student symposium, September 2004, Riverside, California, USA.

Summer courses and Seminars

CREATE Marie Curie training course Fellowship, "From creativity to innovation". **2007**, Udine, Italy, May 23-30, 2007. (Declined).
Procter & Gamble (P&G) Research and Development (R&D) European Ph.D. Seminar **2007**, March 25-28, 2007, P&G Rusham Park Technical Centre, Egham, Surrey, UK.
112th International Summer Course BASF Aktiengesellschaft, August 28-Sept 09, **2006**, BASF Aktiengesellschaft, Ludwigshafen, Germany.

Papers and proceedings

D.I. Medina, B. Hallmark, M.R. Mackley, **2008**. Using hollow microcapillaries to explore the extrusion rheology of polymer films, AIP - Proceedings of the American Institute of Physics, **1027**: 54-56
D.I. Medina, B. Hallmark, T.D. Lord, M.R. Mackley, **2008**. The development of voidage and capillary size within extruded plastic films. Proceedings of the Polymer Processing Society (PPS) 24th Annual Meeting. June 15-19, 2008, Salerno, Italy.
Hallmark B, Medina D.I. and Mackley M.R. **2007**. Continuous Extrusion Processing of Hollow Microcapillary films; Exploring the Boundaries of Hole Size and Voidage. Proceedings of the Polymer Processing Society (PPS) 23rd Annual Meeting. May 27 - 31, 2007, Salvador, Brazil
Lew C.M., Li ZJ., Li S., Hwang S., Medina D.I, Sun M., Davis M.E. and Yan YS. **2007**. Organic-Functionalized Pure-Silica-Zeolite MFI and MEL Films for Low-Dielectric Constant Applications, Materials Research Society (MRS) 2007 Spring Meeting, April 9—13, 2007**,** San Francisco, CA, USA.
Lew C.M., Li ZJ., Li S., Hwang S., Medina D.I, Sun M., Davis M.E. and Yan YS. **2006**. Synthesis and Characterization of Organic-Functionalized Pure-Silica-Zeolite MFI, Electrochemical Society (ECS) 210th International Meeting and XXI Congreso de la Sociedad Mexicana de Electroquimica, October 29-November 3, 2006, Cancun, Mexico.
Lew C.M., Li ZJ., Li S., Hwang S., Medina D.I, Sun M., Davis M.E. and Yan YS. **2005**. Synthesis and Characterization of Organic-Functionalized Pure-Silica-Zeolite, 2005 AIChE Annual Meeting, October 30—November 4, 2005, Cincinnati, Ohio, USA

Conferences

Nobel Prizes, Richard J. Roberts, Lawrence J. Roberts, Peter C. Agre.. November 23-25, **2010**. Research and Postgraduate Department, National Polytechnic Institute (IPN), Mexico City, Mexico.
Certificate in Enterprise, Oct **2006**-March **2007**, Centre for Entrepreneurial Learning, Judge Business School, University of Cambridge, Cambridge, UK.
Dynamics of Complex Fluids, 10 Years on; A Newton Institute Event. October 2-5, **2006**. Issac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, U.K.
Multiscale Rheology. **2005**. British Society of Rheology Midwinter Meeting. December 8-9, 2005. Department of Chemical Engineering, University of Cambridge, Cambridge, UK.
The John Davidson Symposium. **2006**. Department of Chemical Engineering. July 13-14, 2006. University of Cambridge, Cambridge, UK.
NSF NIRT: Zeolite Nanoparticles: Energy, Environment, and Microelectronics, August 2, **2004**, Bourns Hall A171, University of California, CA, USA.

Professional Experience:

2010 **Lecturer and Researcher**, Chemical Engineering
National Polytechnic Institute

Instructor for undergraduate class in Numerical Methods and Probability & Statistics. Responsible for lectures, creation and grading of all tests and out of class assignments. Met with students to discuss progress, deficiencies, and other class-related issues.

2010 **Researcher,** Processes of Transformation
Mexican Petroleum Institute

Investigate and develop novel technological solutions to generate competitive advantages for the best use of hydrocarbons, by means of their conversion to fuels of high technical and ecological quality, and to petrochemical products of high added value. www.imp.mx.

2004 **Teacher Assistant**, Chemical & Environmental Engineering
University of California

Teacher Assistant for undergraduate class in Heat Transfer. Responsible for tutoring students, grading exams and homework, testing, and working with students that need additional aid.

2002-2003 **Lecturer**, Chemical Engineering
National Polytechnic Institute

Instructor for undergraduate class in Numerical Methods. Responsible for lectures, creation and grading of all tests and out of class assignments. Met with students to discuss progress, deficiencies, and other class-related issues.

2000 **Quality Supervisor**, Plastics and Technology
México City

Quality supervisor with 12 internal inspectors in charge. Responsible that our factories maintained the utmost GMP (Good Manufacturing Practices). At the same time responsible that quality management standards were maintained throughout the organization. That each member of the team was fully committed to delivering the highest quality product those customers have come to expect. As a final step, Plastics & Technology Quality Assurance department continually evaluates products from Johnson & Johnson, Colgate-Palmolive through a series of tests to measure stability, finishing and performance.

1999 **Researcher**, Research and Technological Development Center of GIRSA
Lerma, México

Polymer reactions, experimental design and simulations of copolymer MMA/Acrylic esters. Chemical characterization: Molecular weight of the polymer by gas chromatography/mass spectrometry (GC/MS) and x-ray diffraction (XRD). Mechanical Properties: dynamic mechanical analysis, hardness (Izod test). Thermal Characterization: Heat deflection temperature (HDT), glass transition temperature (DSC). Optical characterization: Transmittance (Spectrophotometer).

1998 **Process Engineer** *(Professional Practice)*, Plastiglas of Mexico (GIRSA)
San Luis Potosí, México

Preparation of heat and material balances, development of new or modification of existing specifications (ISO-9002), equipment sizing and process optimization studies. Provide technical support and troubleshoot processes to keep them running efficiently, work closely with operators and production supervisors to get feedback on the operation and design work for improvement projects.

1998 **Chemical Analyst** *(Professional Practice)*, Sugar Factory "El Mante"
Mante Tamaulipas, México

Samples (thick juice, white sugar, molasses, beet pulp and carbonization lime) were analyzed on parameters like brix, polarization, purity, pH, color and ash (thick juice and molasses), particle size distribution (white sugar), dry matter (pulp, lime) and neutralizing value (lime). Separation of colorants by groups has been made by gel permeation chromatography, membrane filtration, dialysis, paper chromatography and electrophoresis.

Technical Skills:

Laboratory & Research:

synthesis of zeolite nanoparticles, centrifugation, spin-coating, chemical vapor deposition, metal deposition, semiconductor parameter analyzer, LCR meter, micro-probe station, ellipsometer, x-ray diffractometer, SEM, STM, Distillation column, absorption packed column, evaporators, rotary dryer, synthesis of polymers, gas chromatograph, spectrophotometer, dynamometer and deflectometer, Extruder, Cambridge Shearing System, Texture Analyzer, Thermal camera, ARES Rheometer.

Software:

Word, Excel, Power Point, Corel Draw, Paintbrush, Various Web Browsers & Email clients on both Windows and Unix Platforms.

Programming Language:

Pascal, Dbase, Fortran 90, Basic, and Visual Basic.

Other academic information:

ESOL Program, Houston Community College – Southeast campus., Houston Texas, (2001)
6815 Rustic Ave. Houston, TX 77087, USA. (HCC-Certificate)
Mathematics and ESL Teacher Assistant, Ulysses High School (Volunteer Job-2002)
501 N McCall, Ulysses, KS 67880, USA

AWARDS/RECOGNITION

National Research System / SNI level 1 (2011-2013)
Keynote Lecture, Annual Meeting of the Polymer Processing Society (2008)
Institute of Physics (IOP) Research Student Conference Fund (2008)
Messel travel Bursar – Society of Chemical Industry (2008)
Royal Academic of Engineering International Travel Grant Award (2008)
British Society of Rheology travel grant (2008)
Highly commended in the Sellafield Ltd Award for Engineering Excellence (2007).
CONACyT scholarship (2006-2008).
Cambridge Philosophical Society Travel Grant (2006 and 2008)
Robinson College Graduate Student Grant (2006)
Teaching consortium Travel Bursary 2006 and 2008 (Aker Kvaerner, Arthur D Little UK Ltd, AstraZeneca, BP, British Sugar, Cadbury Schweppes, ExxonMobil, GlaxoSmithKline, KraftFoods, Merck, Procter and Gamble, Shell)
SEP fellowship (2006-2007)
UC-MEXUS fellowship (2005)
UC fellowship award (2003-2005).
CONACyT scholarship (2003-2005).
UC Teacher Assistantship Award (2004).
Graduated with honors (BS) (top 1% of the 1994-1998 class).
Honorific mention in the BS Thesis.
GIRSA Fellow (1999).
Austromex, Abrasivos Especiales, S. A. de C. V., Outstanding Student of the School of Chemical Engineering and Extractive Industries of the National Polytechnic Institute, 1994.
Telmex Scholarship (1996-1998).
IPN Academic Excellence Scholarship (1994-1995).

Pertinent Courses:

Five semi-annual courses in treatment, process and chemical structure in the production of Polymers.

Associations/memberships:

British Society of Rheology (BSR)
American Chemical Society (ACS)
Society of Chemical Industry (SCI)
Semiconductor Research Corporation (SCR)
Cambridge Philosophical Society
Cambridge Society for the Appreciation of Research (CSAR)
Member of the Institute of Physics (IOP).

Journal refereeing: *Polymer*