

RAFAEL CASAS JR.

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SUMMARY

- ✓ Contributed research to NASA's Johnson Space Center for longer term space missions
- ✓ Neuroscience analyst for HIV research at National Institutes of Health (NIH)
- ✓ Two degrees in Mechanical Engineering and a Minor in Mathematics
- ✓ Managed several business and applied skills in marketing, sales, & web site development
- ✓ Individually organized events with occupancy over 300 people, media coverage, and donors

EDUCATION

New Mexico State University:

Master of Science in Mechanical Engineering – May 2012

Area of Concentration: Materials Science, Bioengineering (GPA: 3.63)

Bachelor of Science in Mechanical Engineering – May 2010

Research Focus: Medical Patient Transfer and Energy Efficiency 2009 - 2010

Dean's List at New Mexico State University – Fall 2009

Minor in Mathematics – *Finite Element Method / Fourier Transforms*

Languages: Fluency in English and Spanish

RELATED EXPERIENCE

Biomedical Research Scientist

(NIH Clinical Center, Fellowship, Sep. 2013-Current)

The Technical Intramural Research Training Award (IRTA) Program offers an opportunity to perform full-time biomedical research at the National Institutes of Health. IRTAs collaborate with leading scientists in the world.

- Utilize both commercially available and proprietary image registration, image analysis and tracer kinetic modeling software in relation to HIV-Associated Neurocognitive Disorders (HAND)
- Responsible for acquisition of DTI, PET & MRI studies contributing to the understanding of HIV pathology
- Complete laboratory work involving animal handling (nonhuman primates/rodents), behavioral tests, radiation and strict safety standards
- Created standalone applications that include image processing and radioactivity calculations

Software: ITK-Snap, MATLAB, Microsoft Office, MIPAV, MRICron, PMOD, SPM8, Visual Studio C#

Equipment: PET Scanner, 7T MRI Scanner

Certification & Training: Animal Users, Lab Safety, Radiation Safety, Small Animal MRI Safety

Award: Outstanding Poster at NIH Postbac Poster Day (May 2014), NIH Academy Certificate Program

Project Engineer

(Harbor Designs & Manufacturing, Temporary, Aug. 2013-Nov. 2013)

Harbor is a design & manufacturing source for products in biomedical, defense & transportation.

- Created 3D CAD models of designs, and prepared 2D drawings that convey the design for manufacturing and assembly purposes
- Worked closely with the customer to capture design intent and to communicate general project details
- Developed and built protocols and fixtures for component validation testing of new product designs
- Strategically sourced component suppliers and selected manufacturers for new designs
- Communicated designs with manufacturers and component suppliers, and sourced cost effective products

Software: Microsoft Office, SolidWorks

Research Engineer & Marketing Director

(BioMat Sciences, Contract, Oct. 2012-Aug. 2013)

BioMat Sciences is a Maryland R&D company focusing on the discovery and commercialization of technologies in oral health. Position was available for fulfillment of a National Science Foundation grant.

- Served as an engineering resource by conducting material analysis, mechanical characterization, microscopy, and spectroscopy of materials in support of R & D studies and product advancements
- Collaborated with NASA's Johnson Space Center and NIST in a multidisciplinary research study of an SBIR Phase I project on work related to long term space missions
- Enhanced knowledge of research methodologies in support of the project, such as SOPs, GMPs and statistical analysis in an FDA environment
- Upgraded company's marketing platform to directly prompt a profit by creating an E-commerce site, raised Search Engine Optimization (SEO), sought out government/research contracts, and met with officials for international expansion
- Responsible for ordering equipment & supplies necessary to carry out experimentation

Software: ImageJ, Microsoft Office Professional, Solidworks, Wordpress

Equipment & Tools: Curing Light, FT Raman Spectroscopy, Grinder-Polisher Machine, Instron, Micro Hardness Tester, Lab Saw, Stereo Microscope

Certification: Good Manufacturing Practices (GMP)

PUBLICATIONS**Assessment of volumetric variations in a small animal brain model of HIV: Comparison of manual and semi-automated methods of quantification***Paper Submitted*Authors: **Rafael Casas**, Kristin Peterson, Awais Mansoor, Georgios Z. Papadakis, Siva Muthusamy, Margaret R. Lentz, Dima Hammoud**Neurobehavioral abnormalities in the HIV-1 Transgenic rat do not correlate with neuronal hypometabolism on 18F-FDG-PET***Paper Submitted*Authors: William C. Reid*, **Rafael Casas***, Georgios Z. Papadakis, Siva Muthusamy, Dianne E. Lee, Wael G. Ibrahim, Deloris Koziol, Dragan Maric, Dima A. Hammoud**The Effect of Focused Microwave Energy on Native Tooth Structure***Conference Paper - AADR Annual Meeting & Exhibition 2014*Authors: **R. CASAS**, G.D. ARNDT, D. BYERLY, J. DUSL, R. RUBINOVITZ, M. SOGNIER, and I. STANGEL**The Cross-Property Connection between Mechanical Properties and Electrical Conductivity of Cortical Bone***Dissertation - New Mexico State University*

This study was designed to expand the base of knowledge of bone modeling. The correlations are of value to various medical practices that include bone grafting and bone remodeling through electrical stimulation. Experiments were followed by mechanical bending tests that provided the force load applied and deflection of cortical bone specimens. Micromechanical modeling was involved in determining conductivity of the bone based off its inhomogeneities. Research on the microstructure emphasized the importance of this aspect to both electrical and mechanical properties and provided for further experimentation on identifying direct electrical relations with density, and mechanical properties.

- Received accolades during defense process for originality of research protocol and analytical prowess regarding the microstructure of cortical bone tissue. Micromechanical modeling and experimentation of electrical conductivity of cortical bone is vital in understanding the affliction of bone related diseases. This also assists for earlier detection than technologies currently allow for.
- Blood was modeled electrically by chemical treatment of bone samples
- Conductivity has been widely studied and demonstrated roughly constant at EEG frequencies (0-100Hz)
- Electrical signals must also be conducted through the skull, where potentials rapidly attenuate due to the low conductivity of the bone

SCIENTIFIC ABSTRACTS & PRESENTATIONS**Value of 18F-FDG-PET/CT in Localizing Ectopic ACTH/CRH Co-secreting Tumors, Causing Cushing Syndrome (CS), in Children and Adolescents***Abstract - Radiological Society of North America (RSNA) 2015 Meeting, Chicago, USA*Authors: Papadakis GZ, Karageorgiadis A, Bagci U, **Casas R**, Millo C, Patronas NJ, Stratakis CA.**Revisiting noise models in small-animal PET***Abstract - SNMMI Annual Meeting 2015*Authors: Awais Mansoor, **Rafael Casas****Semi-Automated Elastic Registration Method to Determine Variations in Brain Volume in a Small Animal Model of HIV Infection***NIH Postbac Poster Day, May 2014 - Outstanding Poster Award*Authors: **R. Casas**, K. Peterson, W. Reid, W. Ibrahim, D.Lee, M.Lentz, D.Hammoud**Spatial Context Learning Approach to Automatic Segmentation of Pleural Effusions in Chest Compute Tomography Images***Abstract - SPIE Medical Imaging 2015*Authors: Awais Mansoor and **Rafael Casas Jr.** and Marius G. Lingurarua States**Microwave-Exposed Artificial Caries Promotes Enhanced Remineralization Compared to Controls***Abstract - IADR/AADR/CADR General Session & Exhibition 2015*Authors: I. STANGEL, G.D. ARNDT, D. BYERLY, **R. CASAS**, R. RUBINOVITZ, C.THERIOT, J. KERR

TECHNICAL SKILLS

- Applications:** Adobe Illustrator, Google SketchUp, ImageJ, Instron Software, LabView, MathCAD, MATLAB, Pro/ENGINEER, RISA, SolidWorks, Trace, Tortoise, WordPress
- Machining:** Casting, CNC Mills, Grinder-Polisher, Lathes, Saw, Stamping, Turning
- Equipment:** Curing Light, Electric Muscle Simulator, FT Raman Spectroscopy, Instron, Intermittent Compression Therapy, Micro Hardness, Milliohmeter, Soldering, Spirometer, Stereo Microscope, Temperature Control Units
- Computer:** CSS, HTML, Microsoft Office Professional, Open Source Research Methods, Web Site Development

PROJECTS**Project Manager***(Energy Efficient Windows, Spring 2010)*

Goal: To develop an energy efficient solution for windows of low income families.

- Working with the customer to understand their product needs, the team developed and coordinated the execution of material/process characterization and validation plans of an existing product
- Modifications based off thermodynamics concepts were successfully adapted at an affordable quotation

Project Engineer*(Medical Patient Transfer Device, Spring 2009)*

Focus: To create an innovative medical solution for better patient outcome.

- Review of existing devices to ensure compliancy with FDA regulatory requirements, along with registered patents
- Innovation of ideas led to the design, development, and manufacturing of an operable hydraulic patient transfer system prototype

AFFILIATIONS**The NIH Academy Certificate Program***(Fall 2014-May 2015)*

This program is for trainees who are interested in learning more about health disparities who may not have previous exposure to or knowledge of the field.

American Society of Mechanical Engineers (ASME, NMSU CHAPTER)*(Fall 2009-Spring 2010)*

- Provided assistance to Haiti in "The Big Meal Packaging Event"
- Secretary, Fall 2009-Spring 2010

Society of Hispanic Professional Engineers (SHPE, NMSU CHAPTER)*(Spring 2010)***NMSU Intramural Volleyball & Soccer**

Fall 2004 Co-ed Volleyball Silver Division Champions (Manager & Player)

SUPPLEMENTARY EXPERIENCE**Natural Gas Pipeline Welding***(STI Group, Contract, May 2013-Jul. 2013)*

Since 1978, STI Group has served the chemical refining, petrochemical, oil & gas production, drilling, energy, power generation, pulp & paper and related industries.

- Machined, treated, and fitted steel pipe lines
- Familiarized with the process and application of TIG welding
- Performed fracture analysis and mechanical strength testing on pipe materials
- Calibrated gas tanks for appropriate distribution based off environmental conditions
- Adhered to OSHA, EPA, and company's safety protocols and specs
- Coordinated with quality control and x-ray technicians to ensure welding standards are met

Equipment & Tools: Bevel Cut Machine, Electrical Leads, Hand Grinder & Polisher, Propane Tank, Voltage Meter, Welding Rig

Mechanical Engineering Intern*(FMS Engineering, LLC., Aug. 2011-Jun. 2012)*

Established and incorporated in El Paso, Texas, FMS Engineering, LLC. is a private company categorized under Engineering Services. Services include: Land Engineering Services, Project Engineering Services, Engineering Management Service and Applied Engineering Service.

- Design/Drafting responsibilities included HVAC, plumbing, central utility systems and process piping systems using AutoCAD software
- Responsible for the preparation of air load calculations, equipment selection, and systems layout
- Performed mechanical engineering functions under the direction of a professional engineer while working with other engineers and architects on multiple projects
- Integral member of a multidiscipline project team to successfully deliver project documents in accordance with the assigned schedule and budget
- Developed familiarity by reading, understanding and applying departmental design guides, standards, systems, applicable engineering codes and FMS policies and procedures

Software: AutoCad MEP 3-D 2012, Google SketchUp, Microsoft Office Professional, Trace

Engineering Assessment Evaluator*(New Mexico State University, Aug. 2010-May 2012)*

- Provided students with a working knowledge of applied thermodynamics
- Aided students with my experiential expertise and knowledge focused on the principles of thermodynamics and fluid mechanics of HVAC system design and installation
- Automated the testing system to facilitate faculty's ability in assessing/monitoring progress of the student's knowledge acquisition of course materials and presentation

Software: Microsoft Office Professional