

Hasan El Rifai

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Curriculum Vitae

I. General

A. **Name:** Hasan M. El Rifai

B. **Present rank and department:** Associate Professor and Chair, Department of Physical Sciences

C. **Degrees held, dates, institutions:**

Spring 2003 - Summer 2007: Ph.D. Analytical Chemistry, Florida State University

Thesis Title: "ASSESSMENT OF THE UTILITY OF CHEMICAL PRETREATMENTS FOR ESTIMATING CARBON AND PHOSPHORUS SEQUESTRATION IN SOILS BY ^{13}C AND ^{31}P NMR SPECTROSCOPY"
GPA: 3.89

Advisor: Professor William T. Cooper

Fall 1998 - Summer 2002: Bachelor of Science in Chemistry, Lebanese University

D. **Date employed at West Virginia University Institute of Technology:** August 15, 2007 (Fall 2007)

E. **Date of tenure & promotion:** Tenured and promoted to Associate Professor on May 15, 2013

F. **Total years of college teaching & professional experience:** 9.5 years

G. **Teaching experience record – where, when, number of hours... etc.**

Teaching Assistant of Chemistry (20 hours/week) Spring 2003 – Summer 2007 (Florida State University) **4.5 years**

Assistant Professor of Chemistry (40 hours/week) Fall 2007 – present (West Virginia University Institute of Technology) **5 years**

H. **Non-teaching work experience including a brief description of the job title:**

- Research Assistant- Chemistry Spring 2003 – Summer 2007 (Florida State University)
- Attended a short course by the coordinator researcher Steven E. Freitag to operate a 300 MHz Varian liquid state NMR and passed the practical exam.
- Attended a short course by the NMR director Dr. Joseph B. Vaughn to operate a 500 MHz Varian liquid state NMR and passed the written and practical exam.
- Attended a short course by the coordinator researcher Dr. Tom Gedris to operate a 500 MHz Wide-Bore Varian/Unity solid state NMR and passed the written and practical exam.
- Completed a short course in Munich, Germany by Professor Heike Knicker “Introduction into the basic theory of Nuclear Magnetic Resonance Spectroscopy and its application in Soil Organic Chemistry”.
- Completed one month practical training in a chemistry lab for testing water and diesel fuel quality at a diesel power plant station in Lebanon.

II. Teaching

A. Teaching responsibilities:

1. Courses/Labs taught with enrollments (20 hours/week)
Spring 2003 – Summer 2007

Courses/Labs Taught at Florida State University (FSU)

- Instructor (Adjunct Faculty) for General Chemistry I (1 Section = 225 students) Summer 2007
- Advanced Analytical Lab “Instrumental Analysis” Spring 2007
- Taught General Chemistry courses and labs for science and non-science majors (Spring 2003 to Fall 2006)
- List of courses I have taught:
 - General Chemistry Survey (non-science major)
 - General Chemistry Survey Lab (non-science major)
 - General Chemistry I
 - General Chemistry I Lab
 - General Chemistry II
 - General Chemistry II Lab

- Advanced Analytical Lab
 - 2. Courses/Labs taught with enrollments (40 hours/week)
Fall 2007 - present

**Courses/Labs Taught at West Virginia University Institute of Technology:
(WVU-Tech.)**

<u>Subject/Couse</u>	<u>Description</u>	<u>Semester .</u>
Chem./115 (2 Sections)	General Chemistry I	Fall 2012
Chem./215	Analytical Chemistry I	Fall 2012
Chem./215	Analytical Chemistry I Lab	Fall 2012
Chem./116 (3Sections)	General Chemistry II Lab	Spring 2012
Chem./115	General Chemistry I	Spring 2012
Chem./116	General Chemistry II	Fall 2011
Chem./116	General Chemistry II Lab	Fall 2011
Chem./115 (2 Sections)	General Chemistry I Lab	Fall 2011
Chem./116	General Chemistry II	Spring 2011
Chem./116	General Chemistry II Lab	Spring 2011
Chem./310	Analytical Chemistry II	Spring 2011
Chem./313	Analytical Chemistry II Lab	Spring 2011
Chem./215	Analytical Chemistry I	Fall 2010
Chem./215	Analytical Chemistry I Lab	Fall 2010
Chem./493	Renewable Energy	Fall 2010
Chem./493	Renewable Energy Lab	Fall 2010
Chem./116 (3 Sections)	General Chemistry II Lab	Spring 2010
Chem./116	General Chemistry II	Spring 2010
Chem./215	Analytical Chemistry I	Fall 2009
Chem./215	Analytical Chemistry I Lab	Fall 2009
Chem./116	General Chemistry II Lab	Fall 2009
Chem./116	General Chemistry II	Fall 2009
Chem./310	Analytical Chemistry II	Spring 2009
Chem./313	Analytical Chemistry II Lab	Spring 2009
Chem./116	General Chemistry II Lab	Spring 2009
Chem./116	General Chemistry II	Spring 2009
Chem./116	General Chemistry II	Fall 2008
Chem./215	Analytical Chemistry I	Fall 2008
Chem./215	Analytical Chemistry I Lab	Fall 2008
Chem./493	Renewable Energy	Fall 2008
Chem./493	Renewable Energy Lab	Fall 2008
Chem./116 (3 Sections)	General Chemistry II Lab	Spring 2008
Chem./116	General Chemistry II	Spring 2008
Chem./113	General Chemistry (nursing) Lab	Fall 2007
Chem./115	General Chemistry I Lab	Fall 2007
Chem./116	General Chemistry II Lab	Fall 2007

Chem./116 General Chemistry II Fall 2007
3. Courses/Labs taught with enrollments (15 hours/week)

Courses/Labs Taught at Marshall University

<u>Subject/Course</u>	<u>Description</u>	<u>Semester .</u>
Chem./111	Foundations of Chemistry	Summer 2012
Chem./111	Foundations of Chemistry	Summer 2011
Chem./203	General Chemistry (non-science major)	Summer 2010

Courses/Labs Taught at University of Charleston

<u>Subject/Course</u>	<u>Description</u>	<u>Semester .</u>
Chem./100	General Chemistry (non-science major)	Summer 2011
Chem./100	General Chemistry Lab (non-science major)	Summer 2011
Chem./102	General Chemistry II	Summer 2011
Chem./102	General Chemistry II Lab	Summer 2011

B. Laboratory and/or course development:

1. Updating and developing course content

- Co-developing with Dr. Rana Jisr a new course from the NASA College Course Development Grant which was awarded **Summer 2012** and will be co-taught Spring 2013 entitled: Introduction to Nanoscience & Nanotechnology. (Check attached printed files)

This course is aimed at introducing the important concepts and applications of nanoscience and nanotechnology to multidisciplinary audience such as chemistry, physics, biology and engineering students. Tools and principles relevant at the nanoscale dimension will be discussed. It also provides an overview of current and future nanotechnology applications in materials, physics, chemistry, biology, electronics, energy and medicine. This course should be suitable for advanced undergraduates.

- Prepare notes, syllabi, tests, etc... for teaching CHM 115 (Fundamentals of Chemistry I). This is the first time I teach this course at Tech. The

power points for this course were designed together with the problem sets for each chapter. A digital copy of all the ppts and problem sets are found on the CD. (I had around 103 students total) **Fall 2012**

- Updated the Analytical Chemistry I course which was offered **Fall 2012**. New chapters and new problem sets have been added. This course was completely converted to power point presentations.
- Updated the Analytical Chemistry II course which was offered Spring 2009. New chapters and new problem sets have been added. This course were completely converted to power point presentations.
- Developed a new course from the NASA College Course Development Grant which was taught Fall 2008 entitled: Chemical Processes in Renewable Energy.

The course is an introduction to chemical processes and technologies in renewable energy to help students research and share information in the merging renewable energy sector and to understand the alternatives to fossil-fuel-based energy generation in different areas of the world. The role of chemical reaction and a basic understanding of the transformations involved were detailed. Case studies were presented and potential solutions were emphasized. The course included guest speakers who presented their views, in addition to field trips to view and gain first hand experience of the various kinds of energy sources.

2. Updating and developing lab content

- Co-developing with Dr. Rana Jisr the lab for the “Introduction to Nanoscience & Nanotechnology” course which will be offered Spring 2013. Laboratory experiments will be conducted to teach the fundamental nano- fabrication and characterization techniques. **Fall 2012**
- Updated the Analytical Chemistry I & II Lab content for the **Fall 2012** & Spring 2011 respectively. New and enhanced experiments were introduced.
- Updated the General Chemistry II Labs offered & Spring 2010 respectively. New and improved experiments were introduced.
- Updated the Renewable Energy Lab where new experiments were added and new lab equipment was purchased from two ACS grants. Spring 2010 & Summer 2011

- Developed the Biodiesel Lab from different grants which was used as a research and teaching tool for undergraduate students. The bioreactor is capable of producing 40 gal of biodiesel in 3 hours. The byproduct (glycerin) was used to make soap bars. 2010
- Developed the Renewable Energy Lab using the NASA grant to purchase lab equipment. Experiments were developed so students can visualize and experiment with various energy alternatives, such as solar energy, hydrogen fuel cells, and solar thermal energy. 2008

III. Scholarship

A. Extension of training:

Conferences:

Attended First Annual West Virginia Biosciences Summit.
Charleston, WV. January 25, 2011.

B. Professional societies:

1. Membership:

- Member of American Chemical Society
- Member of American Solar Energy Society

2. Participation in Professional societies:

- American Chemical Society Kanawha Valley Local Section (ACS-KVS) Chair (Spring-Summer-Fall) 2011
 - i- Executive committee meetings were organized/done
 - ii- Seminars were organized at WVU-Tech., University of Charleston, and WV State University
- American Chemical Society Kanawha Valley Local Section (ACS-KVS) Executive Committee member. (2010-2011-**2012**)

C. Publications:

- Rasha Hamdan, Hasan M. El-Rifai, Alexander W. Cheesman, Benjamin L. Turner; “Linking Phosphorus Sequestration to Carbon Humification in Wetland Soils by ³¹P and ¹³C NMR Spectroscopy” [dx.doi.org/10.1021/es204072k](https://doi.org/10.1021/es204072k) | **Environ. Sci. Technol.** (2012), **46**, 4775–4782
- H. El-Rifai, M. Heerboth, T.E. Gedris, S. Newman, W. Orem, & W.T. Cooper; “NMR and Mass Spectrometry of Phosphorus in Wetlands” *European Journal of Soil Science*, (2008) doi: 10.1111/j.1365-2389.2007.01008.x
- Silveira, M.L.; Comerford, N. B.; Reddy, K. R.; Cooper, W.T.; El-Rifai, H.; “Characterization of soil organic carbon pools by acid hydrolysis” *Geoderma* 144 (2008) 405–414

D. Research Citations:

- Al-Nasra, M.; Jisr, R.; El-Rifai, H. “Active Learning Techniques in Technical Education” College & University Teaching and Learning, Lilly Conference. **2012**. (Presentation & Proceedings)
- Al-Nasra, M.; El-Rifai, H. “Effective Teaching Methods in Technical Education” College & University Teaching and Learning, Lilly Conference. September (22-25) 2011. (Presentation)
- El-Rifai, H. “Biofuels: Biodiesel” American Chemical Society (ACS) National Chemistry Week, University of Charleston, Charleston, WV. Fall 2010 (Seminar)
- El-Rifai, H. “Renewable Energy” American Chemical Society (ACS) Award Banquet at University of Charleston, Charleston, WV. Summer 2010 (Seminar)
- Cooper, W.T.; El-Rifai, H.; Heerboth, M.; Cheesman A.W.; Reddy, K. R.; Turner B. L.; and Newman S. “Linking Phosphorus and Carbon Cycles in Wetland Soils” 10th International Symposium on Wetland Biogeochemistry, Annapolis, MD (2007). (Poster)

- El-Rifai, H. Heerboth, S. Newman, & W.T. Cooper; *“Identification of stable organic phosphorous compounds in Florida Everglades sediments using ^{31}P NMR spectroscopy and high resolution mass spectrometry”* 233rd ACS National Meeting, Chicago, USA (2007). (Poster)
- El-Rifai, H.; Heerboth, M.; Newman, S.; Cooper, W.T.; *“Assessing Historical Changes in Bird Populations in the Florida Everglades by ^{31}P NMR and High Resolution Mass Spectrometry Analyses of Sediment Organic Phosphorus.”* 3rd European Symposium on NMR Spectroscopy in Soil, Geo and Environmental Sciences, Munich, Germany (2006). (Poster)

E. **Research:**

1. **Projects:**

Biofuels: Biodiesel (2010)

This project is funded by the grants I was awarded in 2007 and 2008 and the Chemistry Department at Tech. It is designed to be a research project and a teaching tool for chemistry and engineering students. It will also serve as a recycling facility for the used vegetable oil that cost the school around 6,000\$ to recycle. The Bio-diesel produced will be used by the physical plant at Tech. Add to the above, all the positive environmental impact by recycling and using Biodiesel at Tech.

I have 2 chemistry students working on this project since Fall 2010. Our first batch consisted of 40 gal of Biodiesel and 15 gal of Glycerin which we'll convert to soap. The project consists of the following phases: (note that now we've reached phase v)

- i. Recycling the used vegetable oil produced by the cafeteria
- ii. Mini batch processing to verify the correct method and amount of chemicals needed for the transesterification
- iii. Setting-up and optimizing the Bio-Reactor
- iv. Scaling-up to a large (55 gallon) reaction
- v. Separation of the FAME from the Glycerin
- vi. Filtration and chemical testing (quality control) using the GC/MS and other analytical techniques (quantitative analysis).
- vii. Improve the quality of the FAME produced by applying different and/or enhanced methods of bio-conversion.
- viii. Soap production from Glycerin after chemical treatment.

- ix. Custom molds having the WV TECH logo will be used for the soap production to be given at recruitment and other events for Tech.
- x. Automating the whole system by the collaboration with Dr. Kourosh and his (chemical/electric) engineering students.

Biofuels: Biodiesel (2011)

Five undergraduate research students from the engineering and chemistry department were trained for making mini and large batches of Biodiesel in the lab. They were also trained for transforming the Glycerin into soap and had them experiment on producing different trial batches with different colors and scent. The plan is to have students run the bioreactor to recycle the used vegetable oil produced from the cafeteria. The next step is to have the senior students to proceed on enhancing and creating new methods for improving the FAME production quality.

Fall 2011: update

Because of budget cuts, I lost ALL my research students that I've trained during the Spring semester and the whole project was down. This is very frustrating because I spent all the time and effort prepping those research students so I can move on to the next step and now I'm back to square one!!!

Biofuels: Biodiesel (2012)

Research Work Study Students were not funded by our department because of budget cuts. In addition, the Biodiesel lab was under safety inspection to make sure we follow safety guidelines. The safety inspector from WVU provided a report and his notes were addressed.

2. **Grants Awarded:**

Summer 2012: NASA West Virginia Space Grant Consortium College Course Development Grant Program (Check attached printed files)

Proposal Title:	Introduction to Nanoscience & Nanotechnology
Principal Investigator:	Rana M. Jisr, Assistant Professor of Chemistry
Co-Principal Investigator:	Hasan M. El Rifai, Assistant Professor of Chemistry

Summer 2011: American Chemical Society (ACS) Innovative Project Grant

Proposal Title: Biofuel: Biodiesel Education Program
Principal Investigator: Hasan M. El Rifai, Assistant Professor of Chemistry

Spring 2010: American Chemical Society (ACS) Innovative Project Grant

Proposal Title: Renewable Energy Initiatives and Techniques
Principal Investigator: Hasan M. El Rifai, Assistant Professor of Chemistry

Spring 2008: NASA West Virginia Space Grant Consortium College Course
Development Grant Program

Proposal Title: Chemical Processes in Renewable Energy
Principal Investigator: Hasan M. El Rifai, Assistant Professor of Chemistry

Fall 2007: WV EPSCoR Innovation Grants Program

Proposal Title: Instrumentation for a Renewable Energy Curriculum
and Undergraduate Research at West Virginia
University Institute of Technology (WVU Tech)
Principal Investigator: Hasan M. El Rifai, Assistant Professor of Chemistry

F. Journal Manuscript Editing:

Edited the manuscript entitled: "Formation of Diphenyl Sulfoxide and Diphenyl Sulfide via the Aluminum Chloride Facilitated Electrophilic Aromatic Substitution of Benzene with Thionyl Chloride, and a Novel Reduction of Sulfur (IV) to Sulfur (II)" for Phosphorus, Sulfur, and Silicon and the Related Elements Journal. Manuscript ID (GPSS-2010-0042) Spring 2010

G. Awards:

- Received the “*Excellence in Teaching Award*” from The National Society of Leadership and Success for exemplifying the purpose of the society through excellence in academic student development. April 30, **2011**
- Received a certificate from ACS (American Chemical Society) in recognition of contributions as a Chair to the ACS Local section in West Virginia (**2011**).
- Received a certificate from ACS (American Chemical Society) in recognition of contributions to chemical education by organizing the **2011** U.S. National Chemistry Olympiad Competition.
- Awarded a teaching certificate from “*Program of Instructional Excellency*” **PIE** at Florida State University (**2004**).
- Received the “*Inspirational Staff at Florida State University*” award presented by the National Panhellenic Community at Florida State University (**2006**).
- Received a commendation certificate for having the best final graduation project in the Chemistry Department at the Lebanese University (**2002**).
- Received the first prize award for “*Environmental Engineering Inventions*” at the Annual Schtroumpf Environmental Contest “Go Green” sponsored by the United Nations Development Program (UNDP) (**2002**).

IV. Service:

A. Community service:

- Participated in the BHS College open house event (Fall 2007).
- Participated in the open house event of the Science and Engineering College (Fall 2008).
- Participated in presenting demos for Renewable Energy Technologies with my students at the “Evening with Arts & Sciences” (Fall 2008).
- Participate in holding free help sessions for any student struggling in General Chemistry courses.
- Participated in being a judge in the Math and Science fair between High schools in WV at WVUTech. (Fall 2007 – Fall 2008 – Fall 2009)

- Organized with Dr. Kimberlyn Gray to do Renewable Energy demonstrations to recruit students and make them interested about chemistry and Tech
 - i- *at the following high schools:* (Spring 2009)
 - 1- South Charleston High School on January 29, 2009
(2 classes of International Baccalaureate Physics and Chemistry)
 - 2- Riverside High School on February 10, 2009 (5 classes)
 - 3- Clay High School on February 26, 2009 (5 classes)
 - ii- *at the Chemistry Department at Tech to the following schools:*
(Spring 2009 – Fall 2009 – Spring 2011 – Fall 2011)
 - 1- Visiting students (March 5, 2009)
 - 2- Ansted Middle School (April 9, 2009)
 - 3- Poca High School (October 29, 2009)
 - 4- Riverside High School (November 3, 2009)
 - 5- South Charleston High School (2 hours) (March 12, 2010)
 - 6- South Charleston High School (3 hours Biodiesel Exp.) (Spring 2011)
 - 7- South Charleston High School (3 hours Renewable Energy Demo) (Fall 2011)
 - iii- throughout the day during *Engineering Day at the Clay Center* in Charleston on February 21, 2009 (1,200 local attendees)
 - iv- throughout the day during *Engineering Day at the Clay Center* in Charleston on February 19, 2011 (9 hours)
 - v- during the *Math Field Day* on March 13, 2009.

- Organized with Dr. Kimberlyn Gray to do *water chemistry testing at Morris Creek* with students from South Charleston High School International Baccalaureate Physics, Biology, and Chemistry on October 9, 2009 and (3 hours) (October 6, 2010)

- Participated in the open house event for the College of Engineering & Sciences “Renewable Energy: Biodiesel” Lab demonstration (Fall 2010 - Spring 2011).

- Assigned extra help sessions before exams for the General Chemistry II course and prepared revision problems. (2 x 2 hours) (Spring 2010)
- Performed a “Renewable Energy” demonstrations and power point presentation for the Boy Scouts of America. (3.5 hours) (2010)
- Participated in the Earth Day Event at Hurricane High School where I performed a “Renewable Energy” demonstrations and power point presentation (10 sessions) for **700** students. (7 hours) (Spring 2010)
- Participated in the State Fair Event and presented the Renewable Energy Demo where 1,200 drawstring bags stuffed with WVU Tech major information were distributed and our booth received 6 inquiry cards, and acquired current contact information for 27 alums. (Fall 2010 – Fall 2011)
- Being the ACS Chair of the local section at West Virginia I also had to help in organizing for the International Year of Chemistry (IYC-2011)
- Participated in WVU & WVU Extension Day at the Legislature on February 23, **2012**. I presented Renewable Energy Demos at this event and got students and the general public excited about science and Tech.
- Participated in the Engineering Day at the Clay center with 2 senior chemistry students where we presented Renewable Energy Demos at this event and got students and the general public excited about science and Tech. **2012**
- I’m also an Executive Committee member for the American Chemical Society for Kanawha Valley Section where we hold regular meetings and seminars. Dr. Kenneth O’Connor was a guest speaker at WVU-Tech at the National Chemistry week in October **2012**.

B. Committee assignments:

Committees on which I served or presently serve

- i. I’m on the Retention Team that will discuss and implement new retention initiatives on campus. This team will meet regularly to discuss issues that may arise and will be actively involved in improving our retention rates across campus. **Fall 2012**
- ii. American Chemical Society (WV. Section) Executive Committee member (2010-2011-**2012**)

- iii. Strategic Planning Workshop – Recruitment & Retention for WVU-Tech (2010-2011)
- iv. American Chemical Society WV. Section Chair (Spring-Summer -Fall 2011)
- v. American Chemical Society WV. Section Chair-elect (Spring-Summer -Fall 2010)