

FACULTY newsletter

CPMS Physical and Mathematical Sciences

BYU Featured as Astronomy Pic of the Day ... Again



Photo: Composite Image Data - Subaru Telescope (NAOJ), Hubble Legacy Archive, Michael Joner, David Laney; Processing- Robert Gendler

The West Mountain Observatory is experiencing stardom for the second time this summer. NASA's Astronomy Picture of the Day (APOD) posted another composite image taken by Michael Joner and others at the West Mountain Observatory.

Entitled the Tulip in the Swan, the image features the Tulip Nebula within the nebula-rich constellation Cygnus the Swan. A glowing cloud of gas and dust creates a strong contrast of fiery red and peaceful blue within the image, which NASA featured July 26.

The processed data combined several frames from a year ago and was assembled with narrow-band data. Just like the West Mountain Observatory image featured May 26, Dr. Robert Gendler, an amateur astronomer and medical doctor from Connecticut, processed the image and submitted it for consideration.

The website is viewed worldwide by astrophysics enthusiasts and those interested in staying up-to-date on the most recent galaxy images. Very few images are selected for the website, so having two images chosen from the West Mountain Observatory, in just a few months, is quite an honor.

by: Alysa Kleinman



Computers Reading Between the Lines

For Paul Felt, the combination of computer science and linguistics spells passion. With an undergraduate degree in English under his belt, Felt is working on adding a PhD in computer science to his academic tool belt.

Felt won a Nibley Fellowship from the Neal A. Maxwell Institute for Religious Scholarship for his research in computer annotations of ancient languages. The Nibley Fellowship is awarded to students who study historical—particularly religious—texts.

"Usually people who are applying for this fellowship are associated with

ancient language scholars, not computer science," Felt said. His advisor, Eric Ringger, helped him discover the fellowship.

"Eric Ringger is continually on the lookout for funding opportunities for his students, and he encouraged me to apply for the Nibley fellowship," Felt said. Ringger also set up collaborative opportunities for Felt with Kristian Heal from the Maxwell Institute.

The two collaborated to study Syriac, a specific dialect of ancient Aramaic used by Christians in the Middle East. They used natural language processing

continued on page 2

Dates to Remember

STEM Fair

Thursday, Sep. 20
9 a.m.-3 p.m., WSC Ballroom

Summerhays Lecture

Friday, Sep. 21
7 p.m., 1080 HBLL

CHIRP Proposals Due

Sunday, Sep. 30

HITS Proposals Due

Sunday, Sep. 30

Career and Internship Fair

Wednesday, Oct. 3
10 a.m., WSC Ballroom & Garden Ct

Major Fair

Wednesday, Oct. 10
9:30 a.m.-3:30 p.m., WSC Ballroom

College Grants

Chemistry and Biochemistry

[Jaron Hansen](#)

Sponsor: SCE

Title: Identification of Sources of PM2.5
in the Los Angeles Basin

[Richard Watt](#)

Sponsor: China Lake NWS

Title: Synthesis of Anionic Host Guest
Complexes

Geology

[Jani Radebaugh](#)

Sponsor: NASA

Title: Climate and Organic Inventory
from Dunes on Titan

[Summer Rupper](#)

Sponsor: NSF

Title: Climate and Glacier Change in
Bhutan: the Last Millennia, Present,
and Future

Mathematics

[Gregory Conner](#)

Sponsor: Simons Foundation

Title: Wild Topology, Attractors, and
Algebraic Invariants

[Todd Fisher](#)

Sponsor: Simons Foundation

Title: Entropy for Smooth Dynamical
Systems

Physics and Astronomy

[Dallin Durfee](#)

Sponsor: NSF

Title: Matterwave Interferometry with
Ions

Summer Videos Posted on YouTube

Missing summer already? Catch up on videos produced over the summer at cpms.byu.edu/newvideos/ to relieve your back to school blues.

The new "Hands On" videos posted prove that science is a lot more than just textbooks and formulas. From researching geology at a nearby lake to turning waste into energy, these videos show that getting your hands on real science is exciting. You might even want to enroll in one of our CPMS undergraduate programs.

Another video shows the swag of Sounds to Astound, a group of students who use acoustics to make things boom and bang. The public is welcome to attend their free shows! Look at the Sounds to Astound site to check out upcoming show dates and learn more about the acoustics group.

For seniors looking at advancing their education, the graduate overview videos provide information about CPMS graduate programs by highlighting students in their respective graduate programs.

by: Alysa Kleinman



Paul Felt continued from page 1

(NLP) to study Syriac texts from the time of Christ. NLP applies machine-learning techniques to extract meaningful information and annotate it for organizational purposes.

Annotation through NLP can apply to a variety of fields. For example, email servers use NLP to sort junk emails by determining which words are typically found in a junk email and sorting them into folders.

Linguistically, Heal and Felt use NLP to label the different parts of speech in the Syriac language.

"[On] the linguistics side, we're researching ancient languages for interest in the [Syriac] language," Felt said.

From a cultural standpoint, this interest in the language could unravel some writings and details of Syriac culture. Many Syriac writings haven't been well

studied due to a lack of resources, but Heal and Felt's research is contributing to digitizing a body of manuscripts and data while labeling approximately 10 million words of text.

In this sense, Felt's research contributes not only to findings related to annotation and NLP, but also sheds new light on religious studies.

by: Alysa Kleinman

College Publications

Chemistry and Biochemistry

P.S. Shen, M.J. Domek, E. Sanz-García, A. Makaju, R.M. Taylor, R. Hoggan, M.D. Culumber, C.J. Oberg, D.P. Breakwell, [J.T. Prince](#), [D.M. Belnap](#), "Sequence and Structural Characterization of Great Salt Lake Bacteriophage CW02, a Member of the T7-Like Supergroup", *Journal of Virology*, volume 86/issue 15, 2012, pp. 7907-7917

N. Taylor, [D.E. Austin](#), "A Simplified Toroidal Ion Trap Mass Analyzer", *International Journal of Mass Spectrometry*, volume 321-322, 2012, pp. 25-32

B.M. Lunt, A. Pearson, R. Davis, H. Wang, S. Jamieson, [M.R. Linford](#), "Towards a New Material for SS WORM Storage", *International Symposium on Optical Memory (ISOM)*, 2012, Tokyo Japan

A. Pearson, B. Singh, [M.R. Linford](#), B. Lunt, R. Davis, "The Effect of Geometry on Nanoscale Tellurium Fuses for Solid State Data Storage", *International Symposium on Optical Memory (ISOM)*, 2012 Tokyo Japan

A. Pearson, B. Singh, [M.R. Linford](#), B. Lunt, R. Davis "Materials Study of Nanoscale Fuses for Solid State Data Storage", *International Symposium on Optical Memory (ISOM)*, 2012, Tokyo Japan

A.R. Calchera, A.D. Curtis, [J.E. Patterson](#), "Plasma Treatment of Polystyrene Thin Films Affects More Than the Surface", *ACS Applied Material and Interfaces*, volume 4/issue 7, 2012, pp. 3493-3499

A. Petit, F. Flygare, A.T. Miller, G. Winkel, [D.H. Ess](#), "Transition-State Metal Aryl bond Stability Determines Regioselectivity in Palladium Acetate Mediated C-H Bond Activation of Heteroarenes", *Organic Letters*, volume 14/issue 14, 2012, pp. 3680-3683

D. Devarajan, T.B. Gunnoe, [D.H. Ess](#), "Theory of Late-Transition-Metal Alkyl and Heteroatom Bonding: Analysis of Pt, Ru, Ir, and Rh Complexes", *Inorganic Chemistry*, volume 51/issue 12, 2012, pp. 6710-6718

D. Devarajan, [D.H. Ess](#), "Metal-Mediated Dihydrogen Activation. What Determines the Transition-State Geometry?", *Inorganic Chemistry*, volume 51/issue 11, 2012, pp. 6367-6375

[D.H. Ess](#), T.C. Cook, "Unrestricted Prescriptions for Open-Shell Singlet Diradicals: Using Economical Ab Initio and Density Functional Theory to Calculate Singlet-Triplet Gaps and Bond Dissociation Curves", *Journal of Physical Chemistry A*, volume 116/issue 20, 2012, pp. 4922-4929

[D.H. Ess](#), "Transition-Structure Catalog of Organic Reactions", *Journal of Chemistry Education*, volume 89/issue 6, 2012, pp. 817-818

F. Yang, J. Voelkel, [D.V. Dearden](#), "Collision Cross Sectional Areas from Analysis of Fourier Transform Ion Cyclotron Resonance Line Width: A New Method for Characterizing Molecular Structure", *Analytical Chemistry*, volume 84/issue 11, 2012, pp. 4851-4857

A. Nelson, [M.R. Linford](#), D.R. Wheeler, J.N. Harb, "Use of a Plating Additive to Enable Continuous Metallization of Nanoscale Electrochemically Patterned Chemical Templates", *Electrochimica Acta*, volume 69, 2012, pp. 320-327

[M.R. Linford](#), D.S. Jensen, L.A. Wiest, U.S. Patent No. 8,202,430 "Modified Diamond Particle Surfaces and Method" June 19, 2012

[M.C. Asplund](#), R.C. Davis, D.P. Hansen, [M.R. Linford](#), B.M. Lunt, T.L. Niederhauser, R.T. Perkins, M.O. Worthington, US Patent No. 8,192,820 B2 "Data Storage Media Containing Carbon and Metal Layers" June 5, 2012

D. Jiang, Z. Jin, [D. Henderson](#), J. Wu, "Solvent Effect on the Pore-Size Dependence of an Organic Electrolyte Supercapacitor", *Journal of Physical Chemistry Letters*, volume 3/issue 13, 2012, pp. 1727-1731

L.B. Bhuiyan, [D. Henderson](#), S. Sokolowski, "On the Contact Values of the Density Profiles in an Electric Double Layer Using Density Functional Theory", *Condensed Matter Physics*, volume 15/issue 2, 2012, pp.1-10

Mathematics

J. Kaiser, [J. S. Purcell](#), C. Rollins, "Volumes of Chain Links", *Journal of Knot Theory and Its Ramifications*, volume 21/issue 11, pp. 1250115-1-17

[X. Li](#), "On the Explicit Formula in the Theory of Prime Numbers", *International Journal of Number Theory*, volume 8/issue 3, 2012, pp. 589-597

[G. Conner](#), M. Meilstrup, "Arc-Reduced Forms for Peano Continua", *Topology and its Applications*, volume 159/issue 16, 2012, pp. 3538-3543

[G. Conner](#), M. Meilstrup, "Deforestation of Peano Continua and Minimal Deformation Retracts", *Topology and its Applications*, volume 159/issue 15, 2012, pp. 3243-3262

Announcement

EPSCoR opportunities available for faculty and graduate students.

Information presentation on Utah EPSCoR website (http://iutahepscor.org/presentations/BYU_EPSCoR_26Jul2012.pdf). Additional information about EPSCoR opportunities can be found on the website or from Zach Aanderud from Life Sciences (422-4220; zachary_aanderud@byu.edu, the P.O.C for the current NSF Track II infrastructure grant) or from Conrad Monson (Research Development Specialist, Conrad_monson@byu.edu, 801-422-7722).