

## Biochemistry Welcomes Dr. Eric Ortlund as Assistant Professor

The Department of Biochemistry at Emory University welcomes Dr. Eric Ortlund as Assistant Professor of Biochemistry. Dr. Ortlund comes to Emory from the University of North Carolina, Chapel Hill, where he was a postdoctoral fellow in the Department of Chemistry. Prior to his postdoctoral fellowship at the University of North Carolina, he was a postdoctoral fellow at the University of South Carolina where he also earned his Bachelor of Science degree in Chemistry and a Doctor of Philosophy in Chemistry.

“I am delighted to be here at Emory and I continue to be impressed with the faculty, staff, and students in the Department of Biochemistry,” said Dr. Ortlund. “Emory provides an outstanding environment, supporting world class science, and I look forward to becoming a part of this community!”

The Ortlund lab will use structural biology to focus on nuclear receptor mediated transcription, on complexes between specific lipid transporters and their cognate nuclear receptor

recipients and will utilize structure and ancestral gene resurrection to understand the evolution of novel function within proteins.

Recently, Dr. Ortlund published his work in *Science*, showing for the first time how a medically important protein evolved. By solving the structure of a 450 million-year-old resurrected protein, Dr. Ortlund and his



*Dr. Eric Ortlund*

colleagues from the University of North Carolina and the University of Oregon were able to see the mechanisms by which evolution molded a tiny molecular machine at

the atomic level, and to reconstruct the order of events by which history unfolded (see page 2 for a synopsis of the research, including a figure and description).

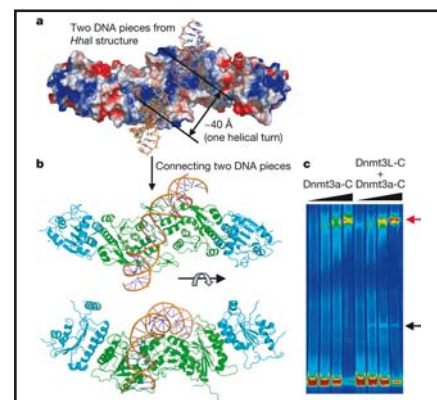
Currently, Dr. Ortlund is co-PI on a grant entitled “Experimental and Structural Evolution of Steroid Hormone Receptors,” in a collaboration with Joe Thornton, Ph.D. from the University of Oregon. Dr. Ortlund has also submitted a grant entitled “Functions of intracellular lipid-binding proteins,” in collaboration with Dr. Noa Noy of Case Western Reserve University to investigate the mechanism by which specific lipids are shuttled to the nucleus to activate transcription. The research will attempt to trap complexes of nuclear receptors with lipid-binding proteins and solve their structures to understand how nuclear receptors acquire these activating ligands.

Dr. Ortlund’s office and laboratory are located in the Biochemistry Connector in rooms G231 and G235. Please stop by to say hello and welcome Dr. Ortlund to the department!

- Publications and Other News
- Awards & Accomplishments
- The Glycomics Center at Emory
- New Employees

## Biochemistry Publications

The Cheng Lab, along with colleagues at Jacobs University, Bremen, Germany, have discovered a pattern in the DNA sequence of the mouse genome that may play a fundamental part in the way DNA molecules regulate gene expression. The publication of the research, “Structure of Dnmt3a bound to Dnmt3L suggests a model for de novo DNA methylation,” was published in the 13th September issue of *Nature*. First author of the paper is Emory chemistry graduate student, Da Jia. Please visit [www.nature.com/nature/journal/vaop/ncurrent/index.html](http://www.nature.com/nature/journal/vaop/ncurrent/index.html) for the full version of the article.



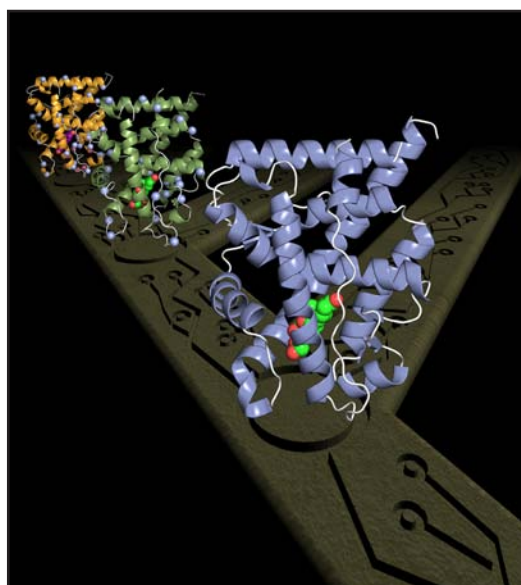
**Figure description:** Model of Dnmt3a–Dnmt3L tetramer with DNA

In addition, The Cheng lab has published two additional *Nature* papers in August in a related topic of epigenetic link between DNA methylation and histone modifications:

Ooi SK, Qiu C, Bernstein E, Li K, Jia D, Yang Z, Erdjument-Bromage H, Tempst P, Lin SP, Allis CD, Cheng X, Bestor TH. (2007) DNMT3L connects unmethylated lysine 4 of histone H3 to de novo methylation of DNA. *Nature*, 448, 714-717.

Lan F, Collins RE, De Cegli R, Alpatov R, Horton JR, Shi X, Gozani O, Cheng X, Shi Y. (2007) Recognition of unmethylated histone H3 lysine 4 links BHC80 to LSD1-mediated gene repression. *Nature*, 448, 718-722.

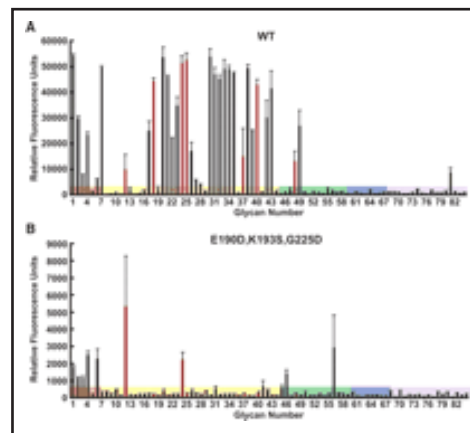
Dr. Eric Ortlund, along with collaborators at the University of Oregon, generated a detailed map that pinpoints the location of every atom in a 450-million-year-old resurrected protein revealing the precise evolutionary steps needed to create the molecule’s modern version.



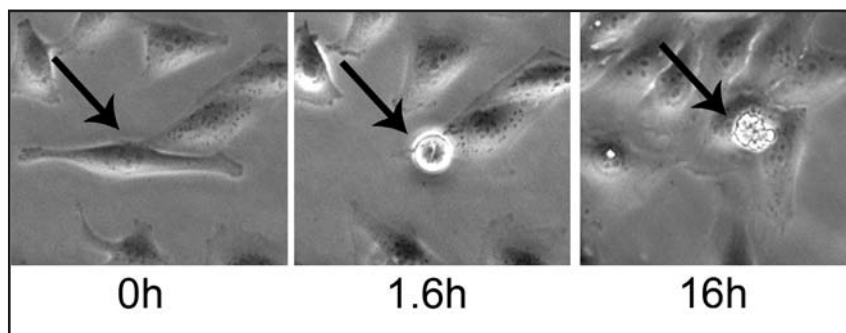
The work was published in the September 14, 2007 issue of *Science*. The researchers examined the precursor to a modern protein known as a glucocorticoid receptor. In humans, the receptor plays a crucial role, responding to the hormone cortisol and regulating the body’s stress response. The two – receptor and hormone – fit together as precisely as a lock and key. The precursor preferred a different hormone, so several mutations were necessary before the lock could fit the cortisol key. By generating a three-dimensional picture of the ancient receptor we were able to see exactly how mutations in the ancient structure led to the modern receptor. Visit [www.sciencemag.org/cgi/content/abstract/1142819](http://www.sciencemag.org/cgi/content/abstract/1142819) for the full version of the article.

Biochemistry Publications (continued)

The Smith Lab published an article entitled, “Immunization by Avian H5 Influenza Hemagglutinin Mutants with Altered Receptor Binding Specificity,” in the August 10, 2007 issue of *Science*, and an advanced online version in *Science Express*. Predicting how avian influenza might change into a human disease has centered on the glycan-binding hemagglutinin (HA) that covers the surface of the influenza virus and is responsible for its initial attachment to and entry into animal cells. Whether the virus infects birds or humans depends on its specificity for glycan structures. In collaboration with Dr. Gary Nabel of the National Institute of Allergy and Infectious Diseases, Dr. David F. Smith, Director of the Protein-Carbohydrate Interaction Core H in the Emory School of Medicine Biochemistry Department, analyzed the recombinant HA from the avian H5N1 and a number of mutated recombinant HA. Specific mutations result in drastic changes in the pattern of binding of the fluorescent-labeled HAs to the 320 glycans on the microarray as shown in the comparison of H5N1 HA and two-amino acid mutant in the figure. Since the HA is the predominant epitope of neutralizing antibodies, production of vaccines against the specific structure that would make an influenza HA specific for human cells might be a path to a pre-emptive vaccine. Please visit [www.sciencemag.org/cgi/content/full/317/5839/825](http://www.sciencemag.org/cgi/content/full/317/5839/825) for the full version of the article.



Jocelyn Lee and Dr. David C. Pallas will have an article entitled, “Leucine carboxyl methyltransferase-1 is necessary for normal progression through mitosis in mammalian cells,” published in *Journal of Biological Chemistry* this fall, with Jocelyn Lee, graduate student in the Pallas Lab, as first author. The paper examines the regulation of the Serine/Threonine phosphatase Protein Phosphatase 2A (PP2A) by its methyltransferase Leucine carboxyl methyltransferase-1 (LCMT-1). We used small hairpin RNAs (shRNA) to reduce LCMT-1 levels in HeLa cells. We found that reduced LCMT-1 levels caused decreased PP2A methylation, increased cell death, increased caspase activation, and mitotic defects evidenced by nocodazole sensitivity. In addition, homozygous gene trap knockout of LCMT-1 in mice resulted in embryonic lethality. Collectively, our results indicate that LCMT-1 is important for normal progression through mitosis and cell survival and is essential for embryonic development in mice. **Figure description:** A portion of LCMT-1 knockdown cells die after entering mitosis. Asynchronous vector control cells (VC), LCMT-1 shRNA knockdown cells (L2 or L3), and B&#945; subunit knockdown cells were observed for 24 to 36 hours by phase time-lapse



microscopy. A representative image of L3 knockdown cells at 0, 1.6, and 16 hours is shown. The black arrow indicates the cell of interest through 3 panels. The metaphase plate (vertical white line) of this cell is visible in panel 2 (1.6h time-point). Please visit [www.jbc.org/cgi/content/abstract/M704861200v1](http://www.jbc.org/cgi/content/abstract/M704861200v1) for the full version of the article.

## Additional Publications

### The Cheng Lab:

- Jia D, Jurkowska RZ, Zhang X, Jeltsch A & Cheng X. (2007) Structure of Dnmt3a bound to Dnmt3L suggests a model for de novo DNA methylation. *Nature* 449, 248-251.
- Ooi SK, Qiu C, Bernstein E, Li K, Jia D, Yang Z, Erdjument-Bromage H, Tempst P, Lin SP, Allis CD, Cheng X, Bestor TH. (2007) DNMT3L connects unmethylated lysine 4 of histone H3 to de novo methylation of DNA. *Nature*, 448, 714-717.
- Lan F, Collins RE, De Cegli R, Alpatov R, Horton JR, Shi X, Gozani O, Cheng X, Shi Y. (2007) Recognition of unmethylated histone H3 lysine 4 links BHC80 to LSD1-mediated gene repression *Nature*, 448, 718-722.
- Higashimoto K, Kuhn P, Desai D, Cheng X, Xu W. (2007) Phosphorylation-mediated inactivation of coactivator-associated arginine methyltransferase 1. *PNAS*, 104, 12318-12323.
- Liebert K, Horton JR, Chahar S, Orwick M, Cheng X, Jeltsch A. (2007) Two alternative conformations of AdoHcy bound to Escherichia coli DNA adenine methyltransferase and the implication of conformational changes in regulating the catalytic cycle. *J. Biol. Chem.*, 282, 22848-22855.
- Lee DY, Ianculescu I, Purcell D, Zhang X, Cheng X, Stallcup MR. (2007) Surface-scanning mutational analysis of protein arginine methyltransferase 1: roles of specific amino acids in methyltransferase substrate specificity, oligomerization, and coactivator function. *Mol Endocrinol*, 21, 1381-1393.
- Horton JR, Elgar SJ, Khan SI, Zhang X, Wade PA, Cheng X. (2007) Structure of the SANT domain from the Xenopus chromatin remodeling factor ISWI. *Proteins*, 67, 1198-1202.
- Wu H, Horton JR, Battaile K, Allali-Hassani A, Martin F, Zeng H, Loppnau P, Vedadi M, Bochkarev A, Plotnikov AN, Cheng X. (2007) Structural basis of allele variation of human thiopurine-S-methyltransferase, *Proteins*, 67, 198-208.
- Cheng X, Zhang X. (2007) Structural dynamics of protein lysine methylation and demethylation. *Mutat Res.*, 618, 102-111.

### The Corbett Lab:

- Lange A, Mills RE, Lange CJ, Stewart M, Devine SE, Corbett AH. (2007) Classical nuclear localization signals: definition, function, and interaction with importin alpha. *J Biol Chem.* 282(8):5101-5.
- Kelly SM, Pabit SA, Kitchen CM, Guo P, Marfatia KA, Murphy TJ, Corbett AH, Berland KM. (2007) Links

Recognition of polyadenosine RNA by zinc finger proteins. *Proc Natl Acad Sci U S A.* 104(30):12306-11.

- Brykailo I M, McLane L., Fridovich-Keil J, Corbett AH. (2007) Analysis of a Predicted Nuclear Localization Signal: Implications for the Intracellular Localization and Function of the Saccharomyces cerevisiae RNA Binding Protein. *Nucleic Acids Research, In Press.*

### The Cummings Lab:

- Song X, Xia B, Lasanajak Y, Smith DF, Cummings RD. (2007) Quantifiable fluorescent glycan microarrays. *Glycoconj J.* Sep 1, *In Press.*
- Amonsens M, Smith DF, Cummings RD, Air GM. (2007) Human parainfluenza viruses hPIV1 and hPIV3 bind oligosaccharides with alpha2-3-linked sialic acids that are distinct from those bound by H5 Avian influenza virus hemagglutinin. *J Virol.*, 81(15):8341-5.
- An G, Wei B, Xia B, McDaniel JM, Ju T, Cummings RD, Braun J, Xia L. (2007) Increased susceptibility to colitis and colorectal tumors in mice lacking core 3-derived O-glycans. *J Exp Med.*, 204(6):1417-29.
- Condac E, Silasi-Mansat R, Kosanke S, Schoeb T, Towner R, Lupu F, Cummings RD, Hinsdale ME. (2007) Polycystic disease caused by deficiency in xylosyltransferase 2, an initiating enzyme of glycosaminoglycan biosynthesis. *Proc Natl Acad Sci U S A.*, 104(22):9416-21.
- Kumari K, Gulati S, Smith DF, Gulati U, Cummings RD, Air GM. (2007) Receptor binding specificity of recent human H3N2 influenza viruses. *Virology*, 9;4:42.
- Williams SA, Xia L, Cummings RD, McEver RP, Stanley P. (2007) Fertilization in mouse does not require terminal galactose or N-acetylglucosamine on the zona pellucida glycans. *J Cell Sci.*, 120(Pt 8):1341-9.
- Nguyen K, van Die I, Grundahl KM, Kawar ZS, Cummings RD. (2007) Molecular cloning and characterization of the Caenorhabditis elegans alpha1,3-fucosyltransferase family. *Glycobiology*, 17(6):586-99.
- Carlsson S, Oberg CT, Carlsson MC, Sundin A, Nilsson UJ, Smith D, Cummings RD, Almkvist J, Karlsson A, Leffler H. (2007) Affinity of galectin-8 and its carbohydrate recognition domains for ligands in solution and at the cell surface. *Glycobiology* 2007, 17(6):663-76.
- Xia B, Sachdev GP, Cummings RD. (2007) Pseudomonas aeruginosa mucoid strain 8830 binds glycans containing the sialyl-Lewis x epitope. *Glycoconj J.*, 24(1):87-95.
- Stowell SR, Karmakar S, Stowell CJ, Dias-Baruffi M, McEver RP, Cummings RD. (2007) Human galectin-1, -2, and -4 induce surface exposure of phosphatidylserine

## Additional Publications (continued)

in activated human neutrophils but not in activated T cells. *Blood*, 109(1):219-27.

van Liempt E, Bank CM, Mehta P, Garcia-Vallejo JJ, Kawar ZS, Geyer R, Alvarez RA, Cummings RD, Kooyk Y, van Die I. (2006) Specificity of DC-SIGN for mannose- and fucose-containing glycans. *FEBS Lett.*, 580(26):6123-31.

### The Devine Lab:

Lange A, Mills RE, Lange CJ, Stewart M, Devine SE, Corbett AH. (2007) Classical nuclear localization signals: definition, function, and interaction with importin alpha. *J Biol Chem.*, 282(8):5101-5.

Mills RE, Bennett EA, Iskow RC, Devine SE. (2007) Which transposable elements are active in the human genome? *Trends Genet.* [Epub ahead of print] April 23(4):183-91.

### The Doetsch Lab:

Patrick WM, Quandt EM, Swartzlander DB, Matsumura I. (2007) Multicopy Suppression Underpins Metabolic Evolvability. *Mol Biol Evol.*, Sep 19; *In Press.* [Epub ahead of print].

### The Edmondson Lab:

Edmondson DE, Binda C, Mattevi A. (2007) Structural insights into the mechanism of amine oxidation by monoamine oxidases A and B. *Arch Biochem Biophys.*, 464(2):269-76.

Wang J, Edmondson DE. (2007) Do monomeric vs dimeric forms of MAO-A make a difference? A direct comparison of the catalytic properties of rat and human MAO-A's. *J Neural Transm.*, 114(6):721-4.

Cruz F, Edmondson DE. (2007) Kinetic properties of recombinant MAO-A on incorporation into phospholipid nanodisks. *J Neural Transm.*, 114(6):699-702.

Edmondson DE, DeColibus L, Binda C, Li M, Mattevi A. (2007) New insights into the structures and functions of human monoamine oxidases A and B. *J Neural Transm.*, 114(6):703-5.

### The Kahn Lab:

Bowzard JB, Cheng D, Peng J, Kahn RA. (2007) ELMOD2 is an Arl2 GTPase-activating protein that also acts on Arfs. *J Biol Chem.*, 282(24):17568-80.

### The Matsumura Lab:

Patrick WM, Quandt EM, Swartzlander DB, Matsumura I. (2007) Multicopy Suppression Underpins Metabolic Evolvability. *Mol Biol Evol.*, Sep 19; *In Press.* [Epub ahead of print].

Geddie ML, Matsumura I. (2007) Antibody-induced oligomerization and activation of an engineered reporter enzyme. *J Mol Biol.*, 369(4):1052-9.

Greene DN, Whitney SM, Matsumura I. (2007) Artificially evolved *Synechococcus* PCC6301 Rubisco variants exhibit improvements in folding and catalytic efficiency. *Biochem J.*, 404(3):517-24.

### The Ortlund Lab:

Ortlund EA, Bridgham JT, Redinbo MR, Thornton JW. (2007) Crystal structure of an ancient protein: evolution by conformational epistasis. *Science*, 317(5844):1544-8.

### The Pallas Lab:

Lee JA, Pallas DC. (2007) Leucine carboxyl methyltransferase-1 is necessary for normal progression through mitosis in mammalian cells. *J Biol Chem.* 2007 Aug 27; *In Press* [Epub ahead of print].

Morales PR, Dillehay DL, Moody SJ, Pallas DC, Pruett S, Allgood JC, Symolon H, Merrill AH Jr. (2007) Safingol toxicology after oral administration to TRAMP mice: demonstration of safingol uptake and metabolism by N-acylation and N-methylation. *Drug Chem Toxicol.*, 30(3):197-216.

### The Reines Lab:

Kopcewicz KA, O'Rourke TW, Reines D. (2007) Metabolic regulation of IMD2 transcription and an unusual DNA element that generates short transcripts. *Mol Cell Biol.*, 27(8):2821-9.

Garber K, Smith KT, Reines D, Warren ST. (2006) Transcription, translation and fragile X syndrome. *Curr Opin Genet Dev.*, 16(3):270-5.

### The Smith Lab:

Yang ZY, Wei CJ, Kong WP, Wu L, Xu L, Smith DF, Nabel GJ. (2007) Immunization by avian H5 influenza hemagglutinin mutants with altered receptor binding specificity. *Science*, 317(5839):825-8.

### The Wilkinson Lab:

Chen Z, Wang Y, Ratia K, Mesecar AD, Wilkinson KD, Baker SC. (2007) Proteolytic processing and deubiquitinating activity of papain-like proteases of human coronavirus NL63. *J Virol.*, 81(11):6007-18.

Allen KD, Chernova TA, Tennant EP, Wilkinson KD, Chernoff YO. (2007) Effects of ubiquitin system alterations on the formation and loss of a yeast prion. *J Biol Chem.*, 282(5):3004-13.

## New Grants

**Dr. Richard D. Cummings**, Professor in Biochemistry, received a National Institutes of Health grant entitled, "Immunity of Schistosome Glycoconjugates," and is also Co-Investigator on a 7-year NIH/NIAID program project grant awarded to the Emory Centers of Excellence for Influenza Research and Surveillance.

**Dr. Scott E. Devine**, Assistant Professor in Biochemistry, received a 3-year competitive renewal of a National Institutes of Health grant entitled, "Natural Genetic Variation in the Human Genome."

**Dr. Paul W. Doetsch**, Professor in Biochemistry, received a 5-year competitive renewal of a National Institutes of Health grant entitled, "Radiation-Induced DNA Damage and Transcriptional Mutagenesis in Tumor Development."

**Dr. Keith D. Wilkinson**, Professor in Biochemistry, received a 4-year competitive renewal of a National Institutes of Health grant entitled, "Ubiquitin-Dependent Proteolysis: Specificity & Mechanism."

## Lab News

**Dr. Robert Collins** and **Dr. Da Jia** in the Cheng laboratory received their Ph.D. degrees.

**Seth Kelly** in Corbett laboratory was awarded 2<sup>nd</sup> place for his oral presentation at the recent GDBBS (Graduate Division of Biomedical and Biological Science) symposium held September 18<sup>th</sup>.

**Laura McLane**, a Genetics and Molecular Biology (GMB) graduate student in Corbett laboratory was awarded a Dean's Fellowship to design, implement, and teach an undergraduate course for Spring 2008.

**Dr. Wayne Patrick**, Postdoctoral Fellow in the Matsumura laboratory, has returned to New Zealand, to start his own lab and begin his position as Lecturer (equivalent to Assistant Professor) at Massey University in Auckland, New Zealand.

**Dr. Zhe Yang**, a former postdoctoral fellow in the Cheng laboratory, is now assistant professor in the Department of Biochemistry & Molecular Biology, Wayne State University School of Medicine, Detroit, MI, where he has started his own lab.



Faculty Teaching Awards

**Dr. Richard Kahn**, Professor in Biochemistry, received the Alec E. Hodel Excellence in Teaching Award for 2005-2006.

**Dr. Sankhavaram (Pani) Panini**, Assistant Professor in Biochemistry, received the Alec E. Hodel Excellence in Teaching Award for 2006-2007.

## Learn About the Glycomics Center at Emory University

**D**r. Richard D. Cummings and Dr. David F. Smith recently established the Glycomics Center at Emory University, part of the larger Consortium for Functional Glycomics (CFG), an international research initiative funded by NIGMS to elucidate the roles of carbohydrate-protein interactions in cell communication at the cell surface.

*And what does the Glycomics Center at Emory do?*

Find out by reading the full story of the Glycomics Center at Emory in the Summer 2007 edition of *Momentum Magazine* found at [www.biochem.emory.edu/news/newsletters](http://www.biochem.emory.edu/news/newsletters). To learn more about the CFG, visit [www.functionalglycomics.org](http://www.functionalglycomics.org).

## Faculty Speaking Engagements

### **XIAODONG CHENG, PH.D., PROFESSOR**

- ▶ December 2007, University of Florida, Department of Biochemistry & Molecular Biology
- ▶ November 2007, 6th TICPS International Conference of Protein Sciences, Shanghai
- ▶ October 2007, University of Texas, M.D. Anderson Cancer Center
- ▶ September 2007, FEBS workshop on RNA and DNA modification enzymes: comparative structure, mechanism, function and evolution, Centre Paul Langevin, France
- ▶ August 2007, Epigenetics Gordon conference, Holderness School, Plymouth, New Hampshire
- ▶ April 2007, National Institute of Environmental Health Sciences, Research Triangle Park
- ▶ April 2007, University of North Carolina School of Medicine, Department of Biochemistry & Biophysics
- ▶ March 2007, New York University medical school, Biochemistry department
- ▶ March 2007, Medical College of Georgia Cancer Center

### **ANITA H. CORBETT, PH.D., ASSOCIATE PROFESSOR**

- ▶ 2007 International Yeast Genetics and Molecular Biology Meeting, Melbourne, Australia
- ▶ 2007 Eurlie Nuclear Transport Meeting, Sicily. Molecular Mechanism of RNA Recognition.
- ▶ 2007 mRNA Export: A Key Step in Gene Expression: Monash Institute of Medical Research, Melbourne Australia

### **RICHARD D. CUMMINGS, PH.D., PROFESSOR**

- ▶ January 2007, Grand Rounds in Medicine, Emory University School of Medicine, Atlanta, Georgia
- ▶ March 2007, Invited Seminar, Gordon Research Conference on Glycobiology, Ventura, California
- ▶ April 2007, Invited Speaker, NIH Workshop on Glycochemistry, Bethesda, Maryland
- ▶ April 2007, Invited Lecture, Emory University School of Medicine, IBS 556 Course, Atlanta, Georgia
- ▶ May 2007, Invited Speaker, 2007 ASBMB/EB Meeting, Washington, DC
- ▶ July 2007, Invited Speaker, 27th Sapporo Cancer Seminar, Tokyo, Japan

### **SCOTT E. DEVINE, PH.D., ASSISTANT PROFESSOR**

- ▶ April 2007, Served as a “DNA Day” ambassador at the Benjamin Mays High School in Atlanta. This involved giving 3 presentations on DNA and the human genome project to biology and chemistry students. Events were sponsored by the National Human Genome Research Institute at the National Institutes of Health to commemorate DNA Day
- ▶ June 2007, Invited speaker, “Active Alu retrotransposons in the human genome”, FASEB meeting on mammalian mobile elements, Tucson, Arizona

### **PAUL DOETSCH, PH.D., PROFESSOR**

- ▶ October 2007, Invited Speaker, The Robert H. Hamilton Seminar Series, Dept of Biochemistry, Temple University School of Medicine
- ▶ October 2007, Invited Speaker, Environmental Mutagen Society 38<sup>th</sup> Annual Meeting, Atlanta, Georgia

**Faculty Speaking Engagements (continued)****DALE EDMONDSON, PH.D., PROFESSOR**

- ▶ December 2006, Guest Lecturer Vanderbilt University, Dept of Biochemistry

**JOHN HORTON, PH.D., ASSISTANT PROFESSOR**

- ▶ Co-Chair and Organizer, “New Structures” session of the American Crystallographic Association (ACA) 2007 Meeting, Salt Lake City, Utah

**ERIC ORTLUND, PH.D., ASSISTANT PROFESSOR**

- ▶ March 2007: Mid Atlantic Crystallography Conference – UVA “Crystal Structure of a Resurrected Protein: Evolution by Conformational Epistasis”
- ▶ March 2007: Lineberger Comprehensive Cancer Center – UNC “Structural Insights into the Evolution of Complex Systems: Resurrecting the > 470 Myo Common Ancestor to the Mineralocorticoid - Glucocorticoid Receptor”
- ▶ March 2007: Pharmacology Seminar – Case Western University, OH “Adoption of the Human Liver Receptor Homologue 1 as a Ligand Regulated Receptor and Structure and Evolution of the >470 myo Common Ancestor to the Mineralocorticoid and Glucocorticoid Receptors”
- ▶ February 2007: Biochemistry Seminar – Emory University, Georgia “Adoption of the Human Liver Receptor Homologue 1 as a Ligand Regulated Receptor and Structure and Evolution of the >470 myo Common Ancestor to the Mineralocorticoid and Glucocorticoid Receptors”
- ▶ February 2007: Structural Biology Seminar – St. Jude Children’s Research Hospital, TN “Adoption of the Human Liver Receptor Homologue 1 as a Ligand Regulated Receptor

and Structure and Evolution of the >470 myo Common Ancestor to the Mineralocorticoid and Glucocorticoid Receptors”

- ▶ October 2006: Triangle Crystallographer Consortium Seminar – Research Triangle, North Carolina, “Structure-Function within Sec14 Superfamily of Proteins and the Structural Insights into the Evolution of Complex System”

**DAVID F. SMITH, PH.D., PROFESSOR**

- ▶ November 2006: “CFG Glycan Array Analysis” Participating Investigators Meeting of the Consortium for Functional Glycomics, Universal City, California
- ▶ November 2006: “Applications and Development of Glycan Microarrays” SATELLITE SYMPOSIUM I: NEW TECHNOLOGIES FOR GLYCOMICS, Universal City, California

**KEITH WILKINSON, PH.D., PROFESSOR**

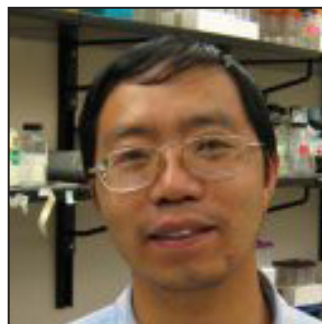
Invited presentations/session chairs:

- ▶ November 2006: SE Regional American Chemical Society Meeting, Savannah, Georgia
- ▶ April 2007: University of Iowa, Iowa City, Iowa
- ▶ April 2007 University of Arkansas, Little Rock, Arkansas:
- ▶ April 2007: Institute for Cancer Research, Fox Chase, Pennsylvania
- ▶ May 2007: Loyola University, Chicago, Illinois
- ▶ May 2007: University of Minnesota Bollum Symposium, Minneapolis, Minnesota
- ▶ May 2007: CSH Meeting “The Ubiquitin Family” Cold Springs Harbor, New York
- ▶ August 2007: NIAID Meeting: Ubiquitin and Ubiquitin-like Modifications in Viral Infection and Immunity Bethesda, Maryland

New Faculty & Staff



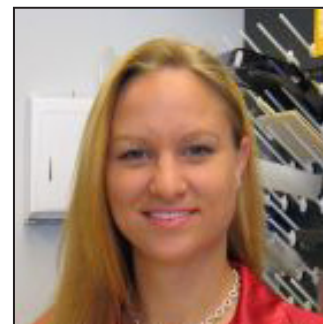
Connie Arthur  
Graduate Student  
Cummings Lab



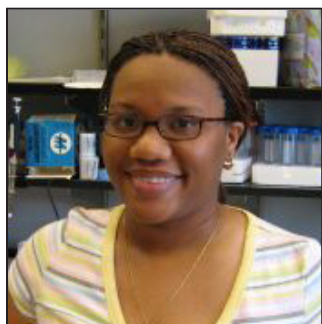
Tiyu Gao, Ph.D.  
Postdoctoral Fellow  
Cheng Lab



Monica Gerth, Ph.D.  
Postdoctoral fellow  
Matsumura Lab



Jennifer Jackson  
Graduate Student  
Pallas Lab



Candace Jones  
Postdoctoral Fellow  
Pallas Lab



Erica Milczek  
Graduate Student  
Chemistry  
Edmondson Lab



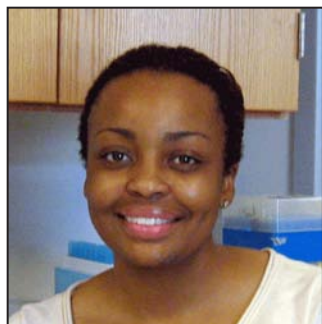
Eric Ortlund, Ph.D.  
Assistant Professor



Kristy Segal  
Research Specialist  
Matsumura Lab



Alex Shank  
Undergraduate Student  
Edmondson Lab



Kenyatta Stephens  
Research Specialist, Sr.  
Cummings Lab



Dan Swartzlander  
Graduate Student  
Doetsch Lab