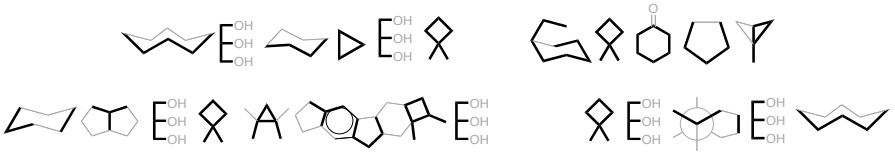

2008-2009 Lit Picks!

MOST SELECTED PAPERS

Multiple members of the group chose each the following papers; papers are listed in descending order of votes, then in alphabetical order by first author in the case of a tie.

Aller, S. G.; Yu, J.; Ward, A.; Weng, Y.; Chittaboina, S.; Zhuo, R.; Harrell, P. M.; Trinh, Y. T.; Zhang, Q.; Urbatsch, I. L.; Chang, G. "Structure of P-Glycoprotein Reveals a Molecular Basis for Poly-Specific Drug Binding". *Science* 2009, *323*, 1718-1722

[7 Votes: Justin, Lauren, Kate, Wes, Christina, Erika, Courtney]

When it comes to protein science, a picture really is worth a thousand words (although a thorough analysis to accompany the figures is certainly also key). For those studying resistance, P-gp is definitely on the short list of proteins for which high-resolution structural information is invaluable to understanding and/or circumventing its mechanisms. This will definitely be a big paper in the field for years to come. – Lauren

The first high-resolution crystal structure of a highly significant protein involved in drug resistance. The structure provides support for and clarifies previous understanding of how P-gp recognizes and effluxes such a wide range of substrates. – Wes

The first "full-length" crystal structure of a P-glycoprotein efflux pump structure is a significant achievement as transmembrane proteins are notoriously difficult to crystallize. In addition, showing multiple drug binding sites and how they interact with the protein puts to rest a 20 year debate over how Pgp could possibly recognize and export so many different compounds. - Christina

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Watson, D. A.; Su, M. J.; Teverovskiy, G.; Zhang, Y.; Garcia-Fortanet, J.; Kinzel, T.; Buchwald, S. L. "Formation of ArF from LPdAr(F): Catalytic Conversion of Aryl Triflates to Aryl Fluorides". Science 2009, 325, 1661-1664.

[6 Votes: Justin, Adam Schrier, Courtney, Dennis, Wes, Christina]

This work opens the door to efficient access to fluorinated aromatic compounds that are increasingly incorporated into pharmaceutical compounds. – Wes

A mild method for generating aryl fluorides with a broad substrate scope – could really revolutionize fluorination methods (especially in pharmaceutical industry). – Christina

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Kim, J.; Ashenhurst, J. A.; Movassaghi, M. "Total Synthesis of (+)-11,11'-Dideoxyverticillin A" Science 2009, 324, 238-241.

[5 Votes: Adam Schrier, Kate, Brian DeChristopher, Kelvin, Dennis]

Movassaghi, M.; Tjandra, M.; Qi, J. "Total Synthesis of (-)-Himandrine" J. Am. Chem. Soc. 2009, 131, 9648-9650

[5 Votes: Pierre-Luc, Kate, Nate, Brian Loy, Christina]

This article details an impressive synthesis of a class II galbulimima alkaloid featuring a late-stage oxidative spirocyclization procedure to form the B-C-F ring juncture. –Brian Loy

The first synthesis of the class II galbulimima alkaloids, complete with an elegant biogenetically inspired oxidative spirocyclization. – Christina

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Stang, E. M.; White, C. M. "Total synthesis and study of 6-deoxyerythronolide B by late-stage C-H oxidation" Nature Chem. 2009, 547

[5 Votes: Nate, Kate, Adam Schrier, Dennis, Christina]

This paper is an elegant example of the application of novel new reaction methods towards the synthesis of a complex molecule. - Christina

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Kohl, S. W.; Weiner, L.; Schwartsburd, L.; Konstantinovski, L.; Shimon, L. J. W. Shimon, Ben-David, Y.; Iron, M. A.; Milstein, D. "Consecutive Thermal H2 and Light-Induce O2 Evolution from Water Promoted by a Metal Complex" Science 2009, 324, 74-77

[2 Votes: Liz, Brian Loy]

This article details the authors' efforts towards the successful splitting of water into dioxygen and dihydrogen, one of the major goals in the renewable energy field. Here, a dearomatized Ru(II) pincer complex is used that can successfully split water under consecutive thermal and irradiative conditions. While certainly not the most efficient process, this article provides an excellent example of how chemistry can be used in solving some of the world's most pressing problems today. – Brian Loy

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Ueda, H.; Satoh, H.; Matsumoto, K.; Sugimotot, K.; Fukuyama, T.; Tokuyama, H. "Total Synthesis of (+)_Haplophytine." Angew. Chem. Int. Ed. 2009, 48, 7600-7613.

[2 Votes: Dennis, Brian Loy]

This article provides the first successful synthesis of this previously elusive decacyclic alkaloid natural product, to which even A. Padwa remarked that "the completed work is a masterpiece of heterocyclic chemistry that captures the essence of complex molecule synthesis." – Brian Loy

PAPERS RECEIVING ONE VOTE

Each of the papers below was chosen by one group member; papers are listed in alphabetical order by first author. (Entries are formatted as submitted by the group.)

Nate	Andresen, B. M.; Du Bois, J. "De Novo Synthesis of Modified Saxitoxins for Sodium Ion Channel Study" J. Am. Chem. Soc. 2009, 131, 12524.
Pierre-Luc	Chen, K.; Baran, P.; "Total synthesis of eudesmane terpenes by site-selective C–H oxidations" Nature, 2009, 459, 824-828
Brian T.	Cobb, N.J. and Surewicz, W.K. "Prion Diseases and Their Biochemical Mechanisms" Biochemistry, 2009, 48 2574–2585.
Lauren	Davi, M.; Lebel, H. "Copper-Catalyzed Tandem Oxidation-Olefination Process" Org. Lett. 2009, 11, 41-44 I'm a fan of a lot of Lebel's one-flask/multiple transformations work. Here is a solid example of such methodology, taking an alcohol to an aldehyde/ketone using catalytic copper (cheap) and oxygen as the terminal oxidant, and following up with a copper-catalyzed olefination w/ diazo reagents. The methodology is not all her own but the streamlined monocatalytic, robust, and tolerant process is noteworthy.
Liz	Douvris, C.; Ozerov, O. V. "Hydrodefluorination of Perfluoroalkyl Groups Using Sillylium-Carborane Catalysts" Science 2008, 321, 1188-1189
Brian D.	Du, C.; Li, L.; Li, Y.; Xie, Z. "Construction of Two Vicinal Quaternary Carbons by Asymmetric Allylic Alkylation: Total Synthesis of Hyperolactone C and (-)-Biyouyanagin A" Angew. Chem. Int. Ed. 2009, 48, 7853-7856
Nate	Ghosh, A. K.; Xi, K. "Total Synthesis of (-)-Platensimycin, a Novel Antibacterial Agent" J. Org. Chem. 2009, 74, 1163.
Nate	Giroux, S.; Corey, E. J. "Enantioselective Synthesis of a Simple Benzenoid Analogue of Glycinoeclepin A" Org. Lett. 2008, 10, 5617.
Kate	Gross, L.; Mohn, F.; Moll, N.; Liljeroth, P.; Meyer, G. "The Chemical Structure of a Molecule Resolved by Atomic Force Microscopy" Science 2009, 325, 1110-1114.
Courtney	Gupta, P.B.; Onder, T.T.; Jiang, G.; Tao, K.; Kuperwasser, C.; Weinberg, R.A.; Lander, E.S. "Identification of selective inhibitors of cancer stem cells by high-throughput screening" Cell 2009 138, 1-15.
Dennis	Hardee, D.; Lambert, T., "Lanthanum(III) Triflate-Catalyzed Cyclopropanation via Intramolecular Methylene Transfer" J. Am. Chem. Soc., 2009, 131, 7536-7537.
Wes	Harrison, D.E.; Strong, R.; Sharp, Z.D.; Nelson, J.F.; Astle, C.M.; Flurkey, K.; Nadon, N.L.; Wilkinson, J.E.; Frenkel, K.; Carter, C.S.; Pahor, M.; Javors, M.A.; Fernandez, E.; Miller, R.A. "Rapamycin Fed Late in Life Extends Lifespan in Genetically Heterogeneous Mice." /Nature/ *2009*, /460/, 1-5
Lauren	Ishikawa, H.; Suzuki, T.; Hayashi, Y. "High-Yielding Synthesis of the Anti-Influenza Neuramidase Inhibitor (-)-Oseltamivir by Three "One-Pot" Operations" Angew. Chem. Int. Ed. 2009, 48, 1304-1307. No, it is not the first synthesis and no, it does not develop a new reaction along the way. However, this paper features a robust synthesis of an extremely high-value target (heard anything about an H1N1 virus?) and sets specific goals – limits for yield, step count, and reagents used – rather than just being one more "approach to" synthesis. The highlight is the use of three, three-reaction/one-flask operations, thereby improving the various

	economies of the sequence. A nice example of good strategy, pure and simple, as part of synthesis design and execution.
Wes	Jackson, K.L.; Henderson, J.A.; Motoyoshi, H.; Phillips, A.J. "A Total Synthesis of Norhalichondrin B." /Angew. Chem. Int. Ed. /*2009*/, 48, /2346–2350 An impressive synthesis of a highly-potent complex natural product target of significant interest
Liz	Johnson, A. P.; Cleaves, H. J.; Dworkin, J. P.; Glavin, D. P.; Lazcano, A.; Bada, J. L. "The Miller Volcanic Spark Discharge Experiment" Science 2008, 322, 404
Kelvin	Jones, S. B.; Simmons, B.; MacMillan, D. W. C. "Nine-Step Enantioselective Total Synthesis of (+)-Minfiensine" J. Am. Chem. Soc. 2009, 131, 13606-13607.
Adam S.	Kim, I. S.; Ngai, M. Y.; Krische, M. J. "Enantioselective Iridium-Catalyzed Carbonyl Allylation from the Alcohol or Aldehyde Oxidation Level via Transfer Hydrogenative Coupling of Allyl Acetate: Departure from Chirally Modified Allyl Metal Reagent in Carbonyl Addition." J. Am. Chem. Soc. 2008, 130, 14891-14899
Justin	Lam, H.; Oh, D.-C.; Cava, F.; Takacs, C. N.; Clardy, J.; de Pedro, M. A.; Waldor, M. K. "D-Amino Acids Govern Stationary Phase Cell Wall Remodeling in Bacteria". Science 2009, 325, 1552-1555.
Brian D.	Laurén J.; Gimbel D. A.; Nygaard H. B.; Gilbert J. W.; Strittmatter S. M. "Cellular Prion Protein Mediates Impairment of Synaptic Plasticity by Amyloid-ß Oligomers" Nature 2009, 457, 1128-1132
Brian L.	Lee, H. M.; Nieto-Oberhuber, C.; Shair, M. D. "Enantioselective Synthesis of (+)-Cortistatin A, a Potent and Selective Inhibitor of Endothelial Cell Proliferation." J. Am. Chem. Soc. 2008, 130, 16864-16866. This article details an impressive synthesis of cortistatin A, a marine natural product with potent antiangiogenic activity, utilizing an aza-Prins/transannular etherification reaction starting from an enantiomerically enriched Hajos-Parrish ketone.
Brian D.	Li, F.; Tartakoff, S. S.; Castle, S. L. "Total Synthesis of (-)-Acutumine" J. Am. Chem. Soc. 2009, 131, 6674-6675
Brian T.	Liang, Y.; Wu, Y.; Feng, D.; Tsai, S.-T.; Son, H.J.; Li, G. and Yu, L. "Development of New Semiconducting Polymers for High Performance Solar Cells" J. Am. Chem. Soc., 2009, 131, 56–57.
Lauren	Lin, S.; Song, C.-X.; Cai, G.-X.; Wang, W.-H.; Shi, Z.-J. "Intra/Intermolecular Direct Allylic Alkylation via Pd(II)-Catalyzed Allylic C-H Activation" J. Am. Chem. Soc. 2008, 130, 12901-12903.
Brian D.	Moreau, B.; Wu, J. Y.; Ritter, T. "Iron-Catalyzed 1,4-Addition of a-Olefins to Dienes" Org. Lett. 2009, 11, 337-339
Justin	Nakamura, I.; Araki, T.; Terada, M. "Five-Bond Cleavage in Copper-Catalyzed Skeletal Rearrangement of O-Propargyl Arylaldoximes to Beta-Lactams". J. Am. Chem. Soc. 2009, 131, 2804-2805.
Christina	Nicewicz, D.A.; Satterfield, A.D.; Schmitt, D.C., Johnson, J.S. "Self-Consistent Synthesis of the Squalene Synthase Inhibitor Zargozic Acid C via Controlled Oligomerization" J. Am. Chem. Soc. 2008, 130, 17281-17283. This paper is a nice example of a controlled oligomerization process and its application towards the total synthesis of a complex molecule.
Kelvin	Nicolaou, K. C.; Sarlah, D.; Wu, T. R.; Zhan, W. "Total Synthesis of Hirsutellone B" Angew. Chem. Int. Ed. 2009, 48, 6870 –6874
Erika	Nilewski, C.; Geisser, R.W.; Carreira, E.M. "Total synthesis of a chlorosulpholipid cytotoxin associated with seafood poisoning" Nature 2009, 457, 573-576.
Brian T.	Nordstrøm, L.U.; Vogt, H. and Madsen, R. "Amide Synthesis from Alcohols and Amines by

	the Extrusion of Dihydrogen" J. Am. Chem. Soc., 2008, 130 17672–17673.
Pierre-Luc	O'Brien, C. J.; Tellez, J. L.; Nixon, Z. S.; Kang, L. J.; Carter, A. L.; Kunkel, S. R.; Przeworski, C.; Chass, G.A. "Recycling the Waste: The Development of a Catalytic Wittig Reaction" Angew. Chem. Int. Ed. 2009, 48, 6836-6839
Justin	Ooguri, A.; Nakai, K.; Kurahashi, T.; Matsubara, S. "Nickel-Catalyzed Cycloaddition of Salicylic Acid Ketals to Alkynes via Elimination of Ketones". J. Am. Chem. Soc. 2009, 131, 13194-13195.
Brian T.	Ozsolak, F.; Milos, P.M.; et. al. "Direct RNA sequencing" Nature, 461, 814-818
Brian L.	Phipps, R. J.; Gaunt, M. J. "A Meta-Selective Copper-Catalyzed C-H Bond Arylation." Science, 2009, 323, 1593-1597. This article details the development of a copper-catalyzed arylation reaction that proceeds selectively at aromatic C-H sites meta to an amido substituent, in direct contrast to the normally-observed electrophilic attack at the ortho/para positions for electron-rich aromatic substrates.
Wes	Rice, G.T.; White, M.C. "Allylic C-H Amination for the Preparation of syn-1,3-Amino Alcohol Motifs." /J. Amer. Chem. Soc./ *2009*, /131/, 11707–11711
Adam S.	Schwartz, B. D.; Denton, J. R.; Lian, Y.; Davies, H. M. L.; Williams, C. M. "Asymmetric [4+3] Cycloadditions between Vinylcarbenoids and Dienes: Application to the Total Synthesis of the Natural Product (-)-5-epi-Vibsanin E." J. Am. Chem. Soc. 2009, 131, 8329-8332
Erika	Smit, E.D.; Swar, I.; Creemer, J.F.; Hoveling, G.H.; Gilles, M.K.; Tyliszczak, T.; Kooyman, P.J.; Zandbergen, H.W.; Morin, C.; Weckhuysen, B.M.; Groot, F.M. "Nanoscale chemical imaging of a working catalyst by scanning transmission X-ray microscopy" Nature 2008, 456, 222-225.
Erika	Snyder, S.A.; Tang, Z.Y.; Gupta, R. "Enantioselective Total Synthesis of (_)-Napyradiomycin A1 via Asymmetric Chlorination of an Isolated Olefin" J Am Chem Soc 2009, 131, 5744-5755.
Kelvin	Strieter, E. R.; Bhayana, B.; Buchwald, S. L. "Mechanistic Studies on the Copper-Catalyzed N-Arylation of Amides" J. Am. Chem. Soc. 2009, 131, 78-88.
Liz	Takaya, J.; Iwasawa, N. "Hydrocarboxylation of Allenes with CO2 Catalyzed by Silyl Pincer-Type Palladium Complex" J. Am. Chem. Soc. 2008, 130, 15254-15255.
Liz	Tiefenbacher, K.; Mulzer, J. "A Nine-Step Total Synthesis of (--)-Platencin" J. Org. Chem. 2009, 74, 2937-2941
Kelvin	Trost, B. M.; Dong, G. "Total Synthesis of Bryostatin 16 using Atom-Economical and Chemoselective Approaches" Nature, 2008, 456, 485-488.
Erika	Ura, Y.; Beierle, J.M.; Leman, L.J.; Orgel, L.E.; Ghadiri, M.R. "Self-Assembling Sequence-Adaptive Peptide Nucleic Acids" Science 2009, 325, 73-77.
Brian T.	Wang, X.; Zhang, B. and Wang, D.Z. "Reductive and Transition-Metal-Free: Oxidation of Secondary Alcohols by Sodium Hydride" J. Am. Chem. Soc., Article ASAP
Lauren	Young, A. J.; White, M. C. "Catalytic Intermolecular Allylic C-H Alkylation" J. Am. Chem. Soc. 2008, 130, 14090-14091. Yes, I'm a sucker for C-H activation. These are two related papers that appeared within one month of each other, using related Pd(II) catalysts to effect allylic alkylation on an unactivated olefin. Catalytic C-H activation with carbon nucleophiles (the malonates, etc., so typical of Tsuji-Trost chemistry) was still a relatively unsolved problem when these two papers appeared last fall. Kudos to these two teams for presenting new solutions to the problem.