Jamey D. Young, Ph.D.

Associate Professor of Chemical and Biomolecular Engineering
Associate Professor of Molecular Physiology and Biophysics
Director of Graduate Recruiting in Chemical Engineering

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February 23, 2016

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1 Experience

Positions Held

Vanderbilt University, Nashville, TN **2008–present**
Associate Professor 2015–present
Department of Chemical and Biomolecular Engineering (primary)
Department of Molecular Physiology and Biophysics (secondary)
Assistant Professor 2008–2015
Vanderbilt Diabetes Research and Training Center (VDRTC) 2008–present
Vanderbilt Institute for Integrative Biosystems Research and Education (VIIBRE) 2010–present
Vanderbilt Center for Quantitative Sciences (CQS) 2015–present

Technical Consultant **2013–present**
Algenol Biofuels, Fort Myers, FL 2013–present
Amyris, Emeryville, CA 2014–present

Eastman Chemical Company, Kingsport, TN **Jun–Dec 1999**
Process Development Engineer, Chemicals Division

TruSeal Technologies, Barbourville, KY **Feb–Aug 2000**
Production Engineer

Education

Postdoctoral Fellow **2005–08**
Massachusetts Institute of Technology, Cambridge, MA
Department of Chemical Engineering
Advisers: Profs. Gregory Stephanopoulos and Joanne K. Kelleher

Ph.D. Chemical Engineering **2000–05**
Purdue University, West Lafayette, IN
Adviser: Prof. Doraiswami Ramkrishna
Thesis: A system-level mathematical description of metabolic regulation combining aspects of elementary mode analysis with cybernetic control laws

B.S. Chemical Engineering **1995–99**
University of Kentucky, Lexington, KY
Summa Cum Laude with Mathematics minor

Awards and Honors

Faculty
DOE Early Career Award 2012
NSF CAREER Award 2010
UEF Emerging Leaders Alliance Program 2008

Postgraduate
NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship 2005

Graduate
Outstanding Chemical Engineering Graduate Student Award, Purdue University 2005
NSF Graduate Research Fellowship 2002
Travel Award, 18th International Symposium of Chemical Reaction Engineering 2004

Undergraduate
Outstanding Senior in Chemical Engineering, University of Kentucky 1999
Outstanding Junior in Chemical Engineering, University of Kentucky 1998
Eastman Chemical Company Scholarship 1998
General Chemistry Excellence Award, University of Kentucky 1996

2 Publications

Refereed Articles and Book Chapters

[1]Equal contributions *Corresponding author *Young lab grad/postdoc* *Young lab undergrad*

Independent work since appointment to Vanderbilt

[1] J. E. Hutton, L. J. Zimmerman, R. J. C. Slebos, I. A. Trenary, **J. D. Young**, M. Li, D. C. Liebler. Oncogenic KRAS and BRAF drive metabolic reprogramming in colorectal cancer. Submitted.

[2] *C. M. Hasenour*, *M. L. Wall*, D. E. Ridley, F. D. James, E. P. Donahue, B. Viollet, M. Foretz, **J. D. Young**, D. H. Wasserman*. *In vivo* dysregulation of fasting liver metabolism through hepatic AMPK deletion. Submitted.

[3] S. M. J. Rahman, X. Ji, L. J. Zimmerman, M. Li, B. K. Harris, M. D. Hoeksema, I. A Trenary, Y. Zou, J. Qian, R. J. C. Slebos, J. Beane, A. Spira, Y. Shyr, R. Eisenberg, **J. D. Young**, D. C. Liebler, P. P. Massion*. The airway epithelium undergoes metabolic reprogramming in individuals at high risk for lung cancer. Submitted.

[4] D. McCloskey, **J. D. Young**, S. Xu, B. O. Palsson, A. M. Feist*. Metabolic flux analysis at the genome-scale increases the scope and accuracy of flux estimations. Submitted.

[5] *R. A. Egnatchik*, E. Brittain, A. T. Shah, J. V. Barnett, D. DeLaughter, J. Seidman, C. E. Seidman, W. H. Fares, H. J. Ford, K. Monahan, C. J. Kang, E. Hysinger, E. Austin, M. C. Skala, **J. D. Young**, L. J. Roberts II, A. R. Hemnes, J. West, J. P. Fessel*. BMP signaling is a fundamental regulator of cellular metabolic program. Submitted.

[6] *A. K. Leamy*, *R. A. Egnatchik*, M. Shiota, **J. D. Young***. Inhibition of triglyceride synthesis does not sensitize hepatic cells to palmitate lipotoxicity or prevent oleate-mediated rescue. Submitted.

[7] D. McCloskey, **J. D. Young**, S. Xu, B. O. Palsson, A. M. Feist*. MID Max: A LC-MS/MS method for measuring the precursor and product mass isotopomer distributions of metabolic intermediates and co-factors for metabolic flux analysis applications. *Analytical Chemistry* DOI: 10.1021/acs.analchem.5b03887, in press.

[8] *Y. M. Whang*, S. I. Park, I. A. Trenary, *R. A. Egnatchik*, J. P. Fessel, J. Kaufman, D. P. Carbone, **J. D. Young***. LKB1 deficiency enhances sensitivity to energetic stress induced by erlotinib treatment in non-small cell lung cancer (NSCLC) cells. *Oncogene* DOI:10.1038/onc.2015.140, in press.

[9] **J. D. Young***. Learning from the steersman: A natural history of cybernetic models. *Industrial & Engineering Chemistry Research* 54:10162–10169, 2015.

[10] *A. O. Adebiyi*, *L. J. Jazmin*, **J. D. Young***. ^{13}C flux analysis of cyanobacterial metabolism. *Photosynthesis Research* 126:19–32, 2015.

[11] *A. G. McAtee*, *L. J. Jazmin*, **J. D. Young***. Application of isotope labeling experiments and ^{13}C flux analysis to enable rational pathway engineering. *Current Opinion in Biotechnology* 36:50–56, 2015.

[12] *C. M. Hasenour*, *M. L. Wall*, D. E. Ridley, C. C. Hughey, F. D. James, D. H. Wasserman, **J. D. Young***. Mass spectrometry-based microassay of ^{2}H and ^{13}C plasma glucose labeling to quantify liver metabolic fluxes *in vivo*. *American Journal of Physiology–Endocrinology and Metabolism* 309:E191–203, 2015.

[13] J. M. Buescher, M. R. Antoniewicz, L. G. Boros, S. Brugess, H. Brunengraber, C. B. Clish, R. J. DeBerardinis, O. Feron, C. Frezza, B. Ghesquiere, E. Gottlieb, K. Hiller, R. G. Jones, J. J. Kamphorst, R. G. Kibbey, A. C. Kimmelman, J. W. Locasale, S. Y. Lunt, O. Maddocks, C. Malloy, C. M. Metallo, E. J. Meuillet, J. Munger, K. Nöh, J. D. Rabinowitz, M. Ralser, U. Sauer, G. Stephanopoulos, J. St-

Pierre, D. A. Tennant, C. Wittmann, M. G. Vander Heiden, A. Vazquez, K. Vousden, **J. D. Young**, N. Zamboni, S.-M. Fendt*. A roadmap for interpreting ^{13}C metabolite labeling patterns from cells. *Current Opinion in Biotechnology* 34:189–201, 2015.

[14] M. L. Wall, L. D. Pound, I. Trenary, R. M. O'Brien, **J. D. Young***. Novel stable isotope analyses demonstrate significant rates of glucose cycling in mouse pancreatic islets. *Diabetes* 64:2129–37, 2015.

[15] F. Ma[1], L. J. Jazmin[1], **J. D. Young***, D. K. Allen*. Isotopically nonstationary ^{13}C flux analysis of changes in *Arabidopsis thaliana* leaf metabolism due to high light acclimation. *Proc Natl Acad Sci USA* 111:16967–16972, 2014.

[16] **J. D. Young***. ^{13}C metabolic flux analysis of recombinant expression hosts. *Current Opinion in Biotechnology* 30C:238–245, 2014.

[17] A. K. Leamy, R. A. Egnatchik, M. Shiota, P. T. Ivanova, D. S. Myers, H. A. Brown, **J. D. Young***. Enhanced synthesis of saturated phospholipids is associated with ER stress and lipotoxicity in palmitate treated hepatic cells. *Journal of Lipid Research* 55:1478–1488, 2014.

[18] N. Templeton, A. Lewis, H. Dorai, E. A. Qian, M. P. Campbell, K. D. Smith, S. E. Lang, M. J. Betenbaugh, **J. D. Young***. The impact of anti-apoptotic gene Bcl-2Δ expression on CHO central metabolism. *Metabolic Engineering* 25:92–102, 2014.

[19] R. A. Egnatchik, A. K. Leamy, D. A. Jacobson, M. Shiota, **J. D. Young***. ER calcium release promotes mitochondrial dysfunction and hepatic cell lipotoxicity in response to palmitate overload. *Molecular Metabolism* 3:544–553, 2014.

[20] **J. D. Young***. INCA: A computational platform for isotopically nonstationary metabolic flux analysis. *Bioinformatics* 30:1333–1335, 2014.

[21] A. G. McAtee, N. Templeton, **J. D. Young***. Role of CHO central carbon metabolism in controlling the quality of secreted biotherapeutic proteins. *Pharmaceutical Bioprocessing* 2:63–74, 2014.

[22] L. J. Jazmin, J. O'Grady, F. Ma, D. K. Allen, J. A. Morgan, **J. D. Young***. Isotopically nonstationary MFA (INST-MFA) of autotrophic metabolism. *Methods in Molecular Biology* 1090:181–210, 2014.

[23] R. A. Egnatchik, A. K. Leamy, Y. Noguchi, M. Shiota, **J. D. Young***. Palmitate-induced activation of mitochondrial metabolism promotes oxidative stress and apoptosis in H4IIEC3 rat hepatocytes. *Metabolism* 63:283–295, 2014.

[24] **J. D. Young***, D. K. Allen, J. A. Morgan. Isotopomer measurement techniques in metabolic flux analysis: Mass spectrometry. *Methods in Molecular Biology* 1083:85–108, 2014.

[25] **J. D. Young***. Metabolic flux rewiring in mammalian cell cultures. *Current Opinion in Biotechnology* 24:1108–1115, 2013.

[26] L. J. Jazmin, **J. D. Young***. Isotopically nonstationary ^{13}C metabolic flux analysis. *Methods in Molecular Biology* 985:367–390, 2013.

[27] C. S. Duckwall, T. A. Murphy, **J. D. Young***. Mapping cancer cell metabolism with ^{13}C flux analysis: Recent progress and future challenges. *Journal of Carcinogenesis* 12:13, 2013.

[28] N. Templeton, J. Dean, P. Reddy, **J. D. Young***. Peak antibody production is associated with increased oxidative metabolism in an industrially relevant fed-batch CHO cell culture. *Biotechnology and Bioengineering* 110:2013–2024, 2013.

[29] D. K. Allen*, **J. D. Young**. Carbon and nitrogen provisions alter the metabolic flux in developing soybean embryos. *Plant Physiology* 161:1458–1475, 2013.

[30] T. A. Murphy, **J. D. Young***. ETA: Robust software for determination of cell specific rates from

extracellular time courses. *Biotechnology and Bioengineering* 110:1748–1758, 2013.

[31] *A. K. Leamy*[1], *R. A. Egnatchik*[1], **J. D. Young***. Molecular mechanisms and the role of saturated fatty acids in the progression of non-alcoholic fatty liver disease. *Progress in Lipid Research* 52:165–174, 2013.

[32] *T. A. Murphy*, C. V. Dang, **J. D. Young***. Isotopically nonstationary ^{13}C flux analysis of Myc-induced metabolic reprogramming in B-cells. *Metabolic Engineering* 15:206-217, 2013.

[33] D. W. Strand, M. Jiang, *T. A. Murphy*, Y. Yi, K. C. Konvinse, O. E. Franco, Y. Wang, **J. D. Young**, S. W. Hayward*. PPARγ isoforms differentially regulate metabolic networks to mediate mouse prostatic epithelial differentiation. *Cell Death and Disease* 3:e361, 2012.

[34] **J. D. Young**[1], A. A. Shastri[1], G. Stephanopoulos*, J. A. Morgan*. Mapping photoautotrophic metabolism with isotopically nonstationary ^{13}C flux analysis. *Metabolic Engineering* 13:656–65, 2011.

[35] O. Srour, **J. D. Young***, Y. C. Eldar*. Fluxomers – A new approach for ^{13}C metabolic flux analysis. *BMC Systems Biology* 5:129, 2011.

Postdoctoral work

[36] Y. Noguchi, **J. D. Young**, J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos*. Tracking cellular metabolomics in lipoapoptosis- and steatosis-developing liver cells. *Molecular BioSystems* 7:1409–19, 2011.

[37] Y. Noguchi[1], N. Shikata[1], N. Nishikata[1], Y. Hara[1], J. O. Aleman, **J. D. Young**, S. Kurihara, N. Koyama, J. K. Kelleher, T. Michio, G. Stephanopoulos*. Ketogenic essential amino acids modulate lipid synthetic pathways and prevent hepatic steatosis in mice. *PLoS ONE* 5:e12057, 2010.

[38] Y. Noguchi[1], **J. D. Young**[1], J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos*. Effect of anaplerotic fluxes and amino acid availability on hepatic lipoapoptosis. *Journal of Biological Chemistry* 284:33425–36, 2009.

[39] **J. D. Young**[1], J. L. Walther[1], M. R. Antoniewicz, H. Yoo, G. Stephanopoulos*. An elementary metabolite unit (EMU) based method of isotopically nonstationary flux analysis. *Biotechnology and Bioengineering* 99:686–99, 2008. **Spotlight article.**

Doctoral work

[40] **J. D. Young**, K. L. Henne, J. A. Morgan, A. E. Konopka, D. Ramkrishna*. Integrating cybernetic modeling with pathway analysis provides a dynamic, systems-level description of metabolic control. *Biotechnology and Bioengineering* 100:542–59, 2008.

[41] **J. D. Young**, D. Ramkrishna*. On the matching and proportional laws of cybernetic models. *Biotechnology Progress* 23:83–99, 2007.

[42] **J. D. Young**, K. L. Henne, J. A. Morgan, A. E. Konopka, D. Ramkrishna*. Cybernetic modeling of metabolism: towards a framework for rational design of recombinant organisms. *Chemical Engineering Science* 59:5041–9, 2004. ISCRE-18 special issue.

Editorials and Commentaries

[1] B. H. Junker*, **J. D. Young***. Editorial overview: Pharmaceutical biotechnology: Engineering cells for high quality biopharmaceuticals production. *Current Opinion in Biotechnology* 30C:viii-x, 2014.

[2] J. L. Reed*, R. S. Senger, M. R. Antoniewicz, **J. D. Young**. Computational approaches in metabolic engineering. *Journal of Biomedicine and Biotechnology* 2010:207414, 2010.

Publications in Preparation

[1] *N. Templeton*, K. D. Smith, S. E. Lang, M. J. Betenbaugh, **J. D. Young***. The metabolic phenotype of GS-IgG expression in CHO cells.

[2] *R. A. Egnatchik*, *A. K. Leamy*, M. Shiota, **J. D. Young***. Glutamate-oxaloacetate transaminase activity promotes hepatic cell lipotoxicity through enhanced anaplerosis.

Published Abstracts

[1] *C. M. Hasenour*, *M. L. Wall*, D. E. Ridley, C. C. Hughey, F. D. James, D. H. Wasserman, **J. D. Young**. A quantitative, mass spectrometry-based platform for phenotyping mouse liver metabolic flux *in vivo*. *Diabetes* 64:A500, 2015.

[2] C. C. Hughey, *C. M. Hasenour*, *M. L. Wall*, **J. D. Young**, D. H. Wasserman. Quantifying the exercise-induced elevation in hepatic metabolic flux in the conscious, unrestrained mouse. *Diabetes* 64:A202, 2015.

[3] B. Fensterheim, I. Trenary, **J. D. Young**, E. Sherwoood. Metabolic reprogramming of macrophages with toll-like receptor ligands. *Shock* 43:29–30, 2015.

[4] *Y. M. Whang*, S. I. Park, I. A Trenary, C. Lee, J. M. Kaufman, D. P. Carbone, **J. D. Young**. LKB1 deficiency enhances sensitivity to energetic stress induced by erlotinib treatment in non-small cell lung cancer (NSCLC) cells. *Cancer Research* 74:1839, 2014.

[5] C. Lee, P. Campbell, *Y. M. Whang*, **J. D. Young**, F. Elefteriou, S. I. Park. Targeting c-Met and VEGFR2 in the stromal compartment of prostate cancer bone metastasis. *Cancer Research* 74:1172, 2014.

[6] *M. L. Wall*, R. M. O'Brien, **J. D. Young**. Novel stable isotope analyses demonstrate significant rates of glucose cycling in pancreatic islets. *Diabetes* 63:A547, 2014.

[7] *R. A. Egnatchik*, *A. K. Leamy*, D. A. Jacobson, M. Shiota, **J. D. Young**. ER calcium efflux promotes mitochondrial dysfunction and hepatic lipotoxicity in response to palmitate overload. *Diabetes* 63:A469, 2014.

[8] R. Nazarewicz, A. Dikalova, A. Bikineyeva, *R. A. Egnatchik*, **J. D. Young**, D. Harrison, S. Dikalov. T cell mitochondrial ROS in development of hypertension. *FASEB Journal* 28:693.15, 2014.

[9] *A. K. Leamy*, *R. A. Egnatchik*, M. Shiota, P. T. Ivanova, D. S. Myers, H. A. Brown, **J. D. Young**. Palmitate-induced alterations in phospholipid composition promote ER stress and cellular dysfunction in hepatic lipotoxicity. *FASEB Journal* 28:1001.2, 2014.

[10] *L. J. Jazmin*, Y. Xu, *A. O. Adebiyi*, C. H. Johnson, **J. D. Young**. Isotopically nonstationary ^{13}C flux analysis of isobutyraldehyde production in *Synechococcus elongatus*. *Abstracts of Papers of the American Chemical Society* 247:148-BIOT, 2014.

[11] *R. A. Egnatchik*, *A. K. Leamy*, D. A. Jacobson, **J. D. Young**. Calcium promotes oxidative stress and metabolic dysfunction in lipotoxicity. *FASEB Journal* 27:834.7, 2013.

[12] *A. K. Leamy*, M. Shiota, **J. D. Young**. Modulating lipid fate controls lipotoxicity in palmitate-treated hepatic cells. *FASEB Journal* 27:1022.1, 2013.

[13] J. P. Fessel, A. T. Shah, *R. A. Egnatchik*, M. C. Skala, **J. D. Young**, C. J. Kang, J. D. West. Increased glutamine metabolism is a key feature of the metabolic reprogramming in BMPR2 mutant pulmonary endothelium. *American Journal of Respiratory and Critical Care Medicine* 187:A1743, 2013.

[14] Y. Noguchi, N. Kojima, N. Shikata, **J. D. Young**, J. O. Aleman, N. Koyama, J. K. Kelleher, M. Takahashi, G. Stephanopoulos. Essential amino acids fortification prevents diet-induced hepatic steatosis and insulin resistance in mice by modulating lipid synthetic pathways. *Diabetes* 58:A361, 2009.

[15] Y. Noguchi, Y. Hara, N. Shikata, J. O. Aleman, **J. D. Young**, S. Kurihara, M. Mori, S. Yoshida, J. K.

Kelleher, M. Takahashi, G. Stephanopoulos. Manipulation of dietary essential amino acids prevents high-fat induced insulin resistance and non-alcoholic fatty liver. *Diabetes* 57:A400, 2008.

[16] Y. Noguchi, Y. Hara, N. Shikata, J. O. Aleman, **J. D. Young**, S. Kurihara, M. Mori, S. Yoshida, J. K. Kelleher, M. Takahashi, G. Stephanopoulos. Manipulation of dietary essential amino acids prevents high-fat induced non-alcoholic fatty liver in mice. *FASEB Journal* 22, 2008.

[17] J. L. Walther, **J. D. Young**, M. R. Antoniewicz, H. Yoo, G. Stephanopoulos. Isotopically nonstationary flux analysis using an elementary metabolite unit (EMU) framework. *Abstracts of Papers of the American Chemical Society* 234:183-BIOT, 2007.

Software Disclosures

All software packages are publicly available at http://mfa.vueinnovations.com

INCA: Isotopomer Network Compartmental Analysis **2013**

MATLAB package for performing steady-state and isotopically nonstationary ^{13}C metabolic flux analysis.

ETA: Extracellular Timecourse Analysis **2012**

MATLAB package for determining specific rates of nutrient uptake and product excretion by regression analysis of extracellular concentration measurements collected over time.

3 Funding

Current and Completed Extramural Research Support

Total extramural Young lab funding awarded to date: $5,355,133.

Principal Investigator (amounts shown are DC+IDC budgeted to Young lab)

[1] CBET-0955251 (Young) 07/01/2010–06/30/2016
"CAREER: Metabolic Determinants of Programmed Cell Death in Hepatic Lipotoxicity"
Amount: $411,900
Source: NSF
Salary support: 6.25%

[2] Amgen Contract #2010529686 (Young) 07/22/2010–10/31/2011
"Metabolic Flux Analysis in Amgen CHO Recombinant Cell Lines"
Amount: $43,051
Source: Amgen, Inc.
Salary support: 4.17%

[3] CBET-1067766 (Young) 05/01/2011–04/30/2014
"Collaborative Research: GOALI: Exploiting Metabolism-Apoptosis Interactions to Enhance Mammalian Cell Culture"
Amount: $182,977
Source: NSF
Collaborators: Mike Betenbaugh, Johns Hopkins (Co-PI) and Haimanti Dorai, Centocor (Co-PI)
Salary support: 4.17%

[4] R21 CA155964 (Young) 07/05/2011–06/30/2014
"Role of Glutaminolysis in the Myc-induced Metabolic Phenotype of Tumor Cells"
Amount: $260,518
Source: NIH-NCI
Salary support: 8.33%

[5] VU-DSR #22682 (Young) 03/01/2012–08/30/2014
"Identifying Pathways of Redox Regulation in LKB1-deficient NSCLC Cells"
Amount: $100,000
Source: Uniting Against Lung Cancer
Collaborator: David Carbone, Ohio State University (Co-Investigator)
Salary support: 5.00%

[6] DE-SC0008118 (Young) 07/01/2012–06/30/2017
"Enhancing Metabolic Flux to Photosynthetic Biofuels"
Amount: $750,000
Source: DOE
Collaborators: Carl Johnson, Vanderbilt (Co-PI) and Yao Xu, Vanderbilt (Co-PI)
Salary support: 6.25%

[7] W81XWH-12-1-0383 (Young) 09/15/2012–09/14/2014
"Targeting Redox Homeostasis in LKB1-deficient NSCLC"
Amount: $114,819
Source: DOD-CDMRP
Collaborator: David Carbone, Ohio State University (Co-PI)
Salary support: 10.00%

[8] VU #1799 (Young) 10/25/2012–04/24/2014
"Evaluation of Glucose Metabolism in Antibody Disulfide Reduction"

Amount: $5,000
Source: Genentech, Inc.
Salary support: 0.00%

[9] Genzyme Contract #20130523 (Young) 05/13/2013–06/30/2016
"Metabolic Flux Analysis of CHO Perfusion Culture"
Amount: $66,066
Source: Genzyme Corporation
Salary support: 6.25%

[10] MMPC MICROMouse Award 25034-29 (Young) 09/01/2013–08/31/2015
"Mass spectrometry-based approach for flux analysis of in vivo liver metabolism"
Amount: $75,000
Source: MMPC at Georgia Regents University (subaward from NIH U24 DK076169)
Collaborator: David Wasserman, Vanderbilt (Co-PI)
Salary support: 5.00%

[11] W81XWH-14-C-0058 (Young) 04/15/2014–04/14/2019
"In Vivo Assessment of Toxicant Exposure in Rats Using Multiple Omics Platforms"
Amount: $1,247,682
Source: DOD-U.S. Army Medical Research Acquisition Activity (USAMRAA)
Collaborator: Masa Shiota, Vanderbilt (Co-PI)
Salary support: 10.00%

[12] IIP-1542695 (Young) 05/15/2015–10/31/2016
"I-Corps: Software and Services to Enable Metabolic Flux Analysis"
Amount: $50,000
Source: NSF
Salary support: 0.00%

[13] R01 DK106348 (Young) 07/01/2015–05/31/2020
"In Vivo 2H/13C Metabolic Flux Analysis of NASH Pathogenesis"
Amount: $1,736,790
Source: NIH-NIDDK
Collaborators: David Wasserman and Masa Shiota, Vanderbilt (Co-Investigators)
Salary support: 20.00%

Role other than PI (amounts shown are DC+IDC)

[14] U54 CA113007 (Vito Quaranta, Vanderbilt) 05/01/2010–02/29/2016
"Multiscale Mathematical Modeling of Cancer Progression"
Amount: $5,927,509 to Vanderbilt
Source: NIH-NCI
Role: Co-Investigator
Salary support: 4.00%

[15] EF-1105249 (Richard Sayre, Los Alamos National Lab) 08/01/2011–02/28/2015
"Engineering C3 Plants with Carbon Concentrating Mechanisms for Enhanced Photosynthesis"
Amount: $141,894 to Young lab
Source: NSF
Role: Co-PI
Salary support: 4.17%

[16] R01 DK092589 (Richard O'Brien, Vanderbilt) 08/23/2011–05/31/2016
"Regulation of Insulin Secretion by G6PC2"
Amount: $1,409,525 to Vanderbilt
Source: NIH-NIDDK

Role: Collaborator
Salary support: 5.00%

[17] CBET-1105991 (Michael Betenbaugh, Johns Hopkins) 09/01/2011–08/31/2015
"Collaborative Research: Engineering Approaches to Cancer Metabolism to Interpret and Develop Improved Treatment Modalities"
Amount: $169,436 to Young lab
Source: NSF
Role: Co-PI
Salary support: 0.75%

[18] R01 CA163563 (Robert Coffey, Vanderbilt) 04/01/2013–03/31/2018
"Role of EGFR ligand-containing exosomes in colorectal cancer"
Amount: $2,122,884 to Vanderbilt
Source: NIH-NCI
Role: Collaborator
Salary support: 0.00%

[19] T32 DK007563 (Richard O'Brien, Vanderbit) 07/01/2013–6/30/2018
"Multidisciplinary Training In Molecular Endocrinology"
Amount: $3,070,442 to Vanderbilt
Sponsor: NIH-NIDDK
Role: Preceptor
Salary support: 0.00%

[20] 14SDG20410081 (Rafal Nazarewicz, Vanderbilt) 07/01/2014–06/30/2018
"T-cell mitochondrial ROS in development of hypertension"
Amount: $308,000 to Vanderbilt
Source: American Heart Association
Role: Collaborator
Salary support: 0.00%

[21] R01 CA177681 (Jin Chen, Vanderbilt) 07/14/2014–05/31/2019
"Ephrin-A1 in Lipogenesis and Breast Cancer Metastatic Progression"
Amount: $1,887,960 to Vanderbilt
Source: NIH-NCI
Role: Collaborator
Salary support: 5.00%

[22] K08 HL121174 (Josh Fessel, Vanderbilt) 09/01/2014–5/31/2019
"Metabolic Reprogramming in Pulmonary Arterial Hypertension"
Amount: $627,050 to Vanderbilt
Sponsor: NIH-NHLBI
Role: Collaborator
Salary support: 0.00%

[23] R21 CA178589 (Vito Quaranta, Vanderbilt) 09/10/2014–08/31/2016
"Inhibition of Proliferation by Laminin"
Amount: $375,021 to Vanderbilt
Sponsor: NIH-NCI
Role: Collaborator
Salary support: 5.00%

[24] R01 HL095797 (James West, Vanderbilt) 12/01/2014–11/30/2018
"Interventions Against the Molecular Etiology of BMPR2-induced PAH"
Amount $2,011,650 to Vanderbilt
Sponsor: NIH-NHLBI

Role: Collaborator
Salary support: 5.00%

Current and Completed Intramural Research Support

Total intramural Young lab funding awarded to date: $150,000.

Principal Investigator (amounts shown are direct costs budgeted to Young lab)

[1] VU Discovery Award (Young) 05/01/2009–06/30/2012
"Comprehensive Analysis of Tumor Metabolism Using Stable Isotope Tracers and Quantitative Flux Determination"
Amount: $100,000
Source: Vanderbilt University Discovery Grant Program
Role: PI
Collaborator: Vito Quaranta, Vanderbilt (Co-PI)
Salary support: 0.00%

[2] Lung Cancer SPORE Pilot Project (Young) 12/01/2011–11/30/2012
"Targeting Redox Metabolism in LKB1-deficient NSCLC"
Amount: $50,000
Source: NIH-NCI P50 CA090949 (David Carbone, PI)
Role: PI
Salary support: 0.00%

Fellowships and Awards Received by Trainees

Postdoctoral Scholars

Clinton Hasenour
Integrated Training in Engineering and Diabetes T32 Fellowship 2015

Graduate Students

Adeola Adebiyi
GAANN Fellowship 2012
Tomlinson Fort Outstanding Teaching Assistant Award 2013

Robert Egnatchik
NSF Graduate Research Fellowship 2010

Keisha Hardeman
NIH F31 Predoctoral Fellowship (Co-mentor with Vito Quaranta) 2012

Alexandra Leamy
Vanderbilt CHBE Distinguished Record of Graduate Research Award 2015
Vanderbilt Scholar in Diabetes Award, graduate student category 2014
Travel Award, ASBMB Annual Meeting 2014
P.E.O. Scholar Award 2013
Best Poster Award, ASBMB Annual Meeting (Lipids and Membranes Theme) 2013
University Graduate Fellowship 2010

Lara Jazmin
Vanderbilt CHBE Outstanding Graduate Student Award 2015
Travel Award, ACS Annual Meeting 2014
Travel Award, 16th International Congress on Photosynthesis Research 2013
63rd Lindau Meeting of Nobel Laureates, Invited participant 2013
DOE Office of Science Graduate Fellowship 2012
GAANN Fellowship 2010
IBM Fellowship 2010

Ali McAtee
- NSF Graduate Research Fellowship 2013
- Tomlinson Fort Outstanding Teaching Assistant Award 2013

Taylor Murphy
- IBM Fellowship 2008

Neil Templeton
- Vanderbilt CHBE Outstanding Graduate Student Award 2014

Kate Venmar Bankaitis
- NIH F31 Predoctoral Fellowship (Co-mentor with Barbara Fingleton) 2014

Undergraduate Students

Lina Aboulmouna
- NSF Graduate Research Fellowship 2011
- Second-place poster award, AIChE Annual Student Conference 2010
- First-place poster award, AIChE Annual Student Conference 2009

Jessica Campos
- First-place poster award, AIChE Annual Student Conference 2011
- Second-place poster award, AIChE Annual Student Conference 2010

Elaine Qian
- Chemistry/Biology Interface (CBI) Training Program

Jacklyn Whitehead
- NSF Graduate Research Fellowship 2014

4 Lectures

Invited Seminars

Independent work since appointment to Vanderbilt

[1] Vanderbilt University, Diabetes Research and Training Center (DRTC). Nashville, TN. Feb 19, 2016.

[2] NIH Mouse Metabolic Phenotyping Centers (MMPC) National Steering Committee Meeting, Bethesda, MD. Dec 17, 2015.

[3] Amyris, Emeryville, CA. Oct 19, 2015.

[4] Agilent Advances in Multi-omics Research Tour, Vanderbilt University. Nashville, TN. Oct 6, 2015.

[5] Protein Expression in Animal Cells (PEACe) Conference, Maximizing Production from Cell Hosts. San Diego, CA. Sep 22, 2015.

[6] Vesalius Research Center, Katholieke Universiteit. Leuven, Belgium. Jun 25, 2015.

[7] Vanderbilt University, Center for Quantitative Systems Biology. Nashville, TN. Jun 19, 2015.

[8] Biogen, Cambridge, MA. Jun 11, 2015.

[9] Agios Pharmaceuticals, Cambridge, MA. Jun 9, 2015.

[10] Vanderbilt University, Renal Research Conference. Nashville, TN. Apr 10, 2015.

[11] Manus Bio, Cambridge, MA. Mar 17, 2015.

[12] University of Minnesota, BioTechnology Institute. St. Paul, MN. Jan 29, 2015.

[13] DOE Office of Science Graduate Fellowship Annual Research Meeting, Fermilab. Batavia, IL. Jul 22, 2014.

[14] Northwestern University, Biotechnology Training Program, Chemical and Biological Engineering Department. Evanston, IL. Jul 21, 2014.

[15] Cornell University, School of Chemical and Biomolecular Engineering. Ithaca, NY. Apr 21, 2014.

[16] AACR Annual Meeting 2014, Methods Workshop: Approaches and Challenges in Studying Cancer Metabolism. San Diego, CA. Apr 5, 2014.

[17] University of California-San Diego, Bioengineering Department. San Diego, CA. Apr 4, 2014.

[18] Georgia Institute of Technology, Chemical and Biomolecular Engineering Department. Atlanta, GA. Oct 30, 2013.

[19] Algenol Biofuels, Fort Myers, FL. Oct 17, 2013.

[20] Auburn University, Chemical Engineering Department. Auburn, AL. Oct 9, 2013.

[21] 5th Annual Bioprocessing Summit. Boston, MA. Aug 20, 2013.

[22] Bioenergy Science Center, Oak Ridge National Lab. Oak Ridge, TN. May 7, 2013.

[23] DOE 2013 Genomic Sciences Contractor-Grantee Meeting XI. Bethesda, MD. Feb 27, 2013.

[24] Vanderbilt University, Cancer Biology Science Hour. Nashville, TN. Feb 19, 2013.

[25] NSF-BBSRC Photosynthetic IDEAS Lab Workshop. Arlington, VA. Feb 9, 2013.

[26] Uniting Against Lung Cancer, Investigator Meeting. New York, NY. Nov 15, 2012.

[27] Vanderbilt Center for Benign Urologic Diseases, Scientific Retreat. Nashville, TN. Jun 27, 2012.

[28] Amgen, Inc. Cell Sciences & Technology. Seattle, WA (via WebEx). Feb 8, 2012.

[29] West Virginia University, Chemical and Biomolecular Engineering Department. Morgantown, WV. Dec 9, 2011.

[30] University of Kentucky, Chemical and Materials Engineering Department. Lexington, KY. Sep 28, 2011.

[31] NSF-BBSRC "Surpassing Evolution" Kickoff Meeting. Cambridge, UK. Jun 27, 2011.

[32] University of California-Berkeley, Department of Chemical and Biomolecular Engineering. Berkeley, CA. Apr 27, 2011.

[33] Donald Danforth Plant Science Center, St. Louis, MO. Mar 9, 2011.

[34] Duke University, Sarah W. Stedman Nutrition and Metabolism Center. Durham, NC. Dec 14, 2010.

[35] Vanderbilt University, Molecular Physiology and Biophysics Department. Nashville, TN. Sep 2, 2009.

[36] Vanderbilt University, Biomedical Engineering Department. Nashville, TN. Oct 1, 2008.

Postdoctoral work

[37] Rice University, Department of Chemical and Biomolecular Engineering. Houston, TX. Mar 13, 2008.

[38] N. C. State University, Department of Chemical and Biomolecular Engineering. Raleigh, NC. Mar 10, 2008.

[39] University of Tennessee, Department of Chemical and Biomolecular Engineering. Knoxville, TN. Mar 4, 2008.

[40] Vanderbilt University, Department of Chemical and Biomolecular Engineering. Nashville, TN. Feb 18, 2008.

[41] Northwestern University, Department of Chemical and Biological Engineering. Evanston, IL. Jan 31, 2008.

Doctoral work

[42] University of Kentucky, Chemical and Materials Engineering Department. Lexington, KY. Apr 27, 2005.

Conference Presentations

*Presenter *Young lab grad/postdoc* *Young lab undergrad*

Independent work since appointment to Vanderbilt

[1] **J. D. Young***. Application of ^{13}C Flux Analysis to Identify Molecular Disease Mechanisms: From Cells to Whole Animals. Paper 211d, AIChE 2015 Annual Meeting, Salt Lake City, UT. Nov 8–13, 2015.

[2] *L. J. Jazmin**, *A. O. Adebiyi*, C. H. Johnson, Y. Xu, **J. D. Young**. Isotopically Nonstationary ^{13}C Flux Analysis of Isobutyraldehyde Production in *Synechococcus elongatus*. Paper 466e, AIChE 2015 Annual Meeting, Salt Lake City, UT. Nov 8–13, 2015.

[3] *A. K. Leamy*, M. Shiota, **J. D. Young***. Inhibition of Triglyceride Synthesis Does Not Sensitize Hepatic Cells to Palmitate Lipotoxicity or Interfere with Oleate-Mediated Rescue. Paper 494b, AIChE 2015 Annual Meeting, Salt Lake City, UT. Nov 8–13, 2015.

[4] *N. Templeton*, *A. G. McAtee**, K. Smith, S. Lang, M. J. Betenbaugh, **J. D. Young**. Application of ^{13}C Flux Analysis to Identify High-Productivity CHO Metabolic Phenotypes. Paper 727g, AIChE 2015 Annual Meeting, Salt Lake City, UT. Nov 8–13, 2015.

[5] S. Subramanian*, F. Ma, N. Friedland, S. Stutz, L. J. Jazmin, M. Krishanmurthy, D. Hanson, **J. D. Young**, D. K. Allen, R. T. Sayre. Engineering carbon concentration mechanisms (CCM) in C3 plants. American Society of Plant Biologists Annual Meeting, Minneapolis, MN. Jul 25–30, 2015.

[6] N. Templeton, A. G. McAtee*, K. D. Smith, S. E. Lang, **J. D. Young**. High productivity CHO metabolic phenotypes identified by ^{13}C flux analysis. Poster 81, Biochemical and Molecular Engineering XIX, Puerto Vallarta, Mexico. Jun 12–16, 2015.

[7] X. Ji*, J. Qian, J. Rahman, B. Harris, M. Hoeksema, H. Chen, R. Eisenberg, **J. D. Young**. SLC7A11 contributes to the pathogenesis of lung cancer. Poster A10, AACR Metabolism and Cancer Special Conference, Bellevue, WA. Jun 7–10, 2015.

[8] K. N. Hardeman*, C. Peng, B. Paudel, D. Tyson, **J. D. Young**, V. Quaranta, J. P. Fessel. BRAF-mutated melanomas exhibit distinct metabolic programs that may determine therapeutic response. Poster A43, AACR Metabolism and Cancer Special Conference, Bellevue, WA. Jun 7–10, 2015.

[9] C. M. Hasenour, M. L. Wall, D. E. Ridley, C. C. Hughey, F. D. James, D. H. Wasserman, **J. D. Young***. A Quantitative, Mass Spectrometry-based Platform for Phenotyping Mouse Liver Metabolic Flux In Vivo. Poster 1944-P, American Diabetes Association 75th Scientific Sessions, Boston, MA. Jun 5–9, 2015.

[10] C. C. Hughey*, C. M. Hasenour, M. L. Wall, **J. D. Young**, D. H. Wasserman. Quantifying the Exercise-induced Elevation in Hepatic Metabolic Flux in the Conscious, Unrestrained Mouse. Poster 800-P, American Diabetes Association 75th Scientific Sessions, Boston, MA. Jun 5–9, 2015.

[11] D. K. Allen*, **J. D. Young**, F. Ma, L. J. Jazmin. Applications of Isotopic Labeling & Isotopically Nonstationary Metabolic Flux Analysis to Plant Metabolism. Photorespiration—Key to Better Crops, Rostock, Germany. Jun 1–4, 2015.

[12] F. Ma*, L. J. Jazmin, **J. D. Young**, D. K. Allen. Isotopically Nonstationary ^{13}C Flux Analysis of Changes in *Arabidopsis thaliana* Leaf Metabolism Due to High Light Acclimation. ASPB 2015 Midwestern Section Meeting, St. Louis, MO. Mar 21–22, 2015.

[13] F. Ma*, L. J. Jazmin, **J. D. Young**, D. K. Allen. Application of Isotopically Nonstationary Metabolic Flux Analysis to Assess the Acclimation of Plant Leaves to Environmental Perturbations. Institute of Biological Engineering Annual Meeting, St. Louis, MO. Mar 5–7, 2015.

[14] L. J. Jazmin, A. O. Adebiyi, Y. Xu, C. H. Johnson, **J. D. Young***. Isotopically nonstationary ^{13}C flux analysis of isobutyraldehyde production in *Synechococcus elongatus*. 2015 DOE Genomic Science Contractors-Grantees Meeting XIII, Tysons, VA. Feb 22–25, 2015.

[15] F. Ma*, L. J. Jazmin, **J. D. Young**, D. K. Allen. Isotopically Nonstationary ^{13}C Flux Analysis of Changes in *Arabidopsis thaliana* Leaf Metabolism Due to High Light Acclimation. Gordon Research Conference on Plant Lipids, Galveston, TX. Feb 1–6, 2015.

[16] A. O. Adebiyi*, L. J. Jazmin, Y. Xu, C. H. Johnson, **J. D. Young**. Optimal design of isotopically nonstationary ^{13}C metabolic flux analysis of cyanobacteria. Paper 712f, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[17] L. J. Jazmin*, F. Ma, D. K. Allen, **J. D. Young**. Isotopically nonstationary ^{13}C flux analysis of changes in *Arabidopsis thaliana* leaf metabolism due to environmental and genetic perturbations. Paper 640g, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[18] A. K. Leamy, R. A. Egnatchik, M. Shiota, P. Ivanova, D. Myers, H. A. Brown, **J. D. Young***. Palmitate-induced alterations in phospholipid composition promote ER stress and cellular dysfunction in hepatic lipotoxicity. Paper 468e, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[19] C. S. Duckwall, **J. D. Young***. ^{13}C metabolic flux analysis of metabolic reprogramming induced by

AKT signaling in cancer cells. Paper 282a, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[20] **J. D. Young***. The metabolic phenotypes of industrial IgG-expressing CHO cells. Paper 173e, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[21] A. G. McAtee*, N. Templeton, A. Lewis, K. Smith, M. J. Betenbaugh, **J. D. Young**. ^{13}C flux analysis of metabolic phenotypes associated with apoptotic resistance in CHO cells. Paper 173d, AIChE 2014 Annual Meeting, Atlanta, GA. Nov 16–21, 2014.

[22] **J. D. Young***. Mapping photoautotrophic carbon metabolism using the INCA ^{13}C flux analysis platform. Session 5: Computational Methods and Design, Metabolic Engineering X, Vancouver, Canada. Jun 15–19, 2014.

[23] L. J. Jazmin*, F. Ma, D. K. Allen, **J. D. Young**. Isotopically nonstationary ^{13}C metabolic flux analysis of *Arabidopsis thaliana* rosettes at altered light conditions. Poster #36, Metabolic Engineering X, Vancouver, Canada. Jun 15–19, 2014.

[24] A. O. Adebiyi, L. J. Jazmin, Y. Xu, C. H. Johnson, **J. D. Young***. Isotopically nonstationary ^{13}C flux analysis of isobutyraldehyde production in *Synechococcus elongatus*. Poster #2, Metabolic Engineering X, Vancouver, Canada. Jun 15–19, 2014.

[25] M. L. Wall, R. M. O'Brien, **J. D. Young***. Novel stable isotope analyses demonstrate significant rates of glucose cycling in pancreatic islets. Poster 2147-P, American Diabetes Association 74th Scientific Sessions, San Francisco, CA. Jun 13–17, 2014.

[26] R. A. Egnatchik, A. K. Leamy, D. A. Jacobson, M. Shiota, **J. D. Young***. ER calcium efflux promotes mitochondrial dysfunction and hepatic lipotoxicity in response to palmitate overload. Poster 1820-P, American Diabetes Association 74th Scientific Sessions, San Francisco, CA. Jun 13–17, 2014.

[27] N. Templeton*, K. D. Smith, S. E. Lang, M. J. Betenbaugh, **J. D. Young**. The metabolic reprogramming of industrial IgG expressing CHO. Understanding and Control of Cell Metabolism oral session, Cell Culture Engineering XIV, Quebec City, Canada. May 4–9, 2014.

[28] N. Templeton*, A. Lewis, H. Dorai, E. A. Qian, M. P. Campbell, K. D. Smith, S. E. Lang, M. J. Betenbaugh, **J. D. Young**. ^{13}C flux analysis of metabolic phenotypes associated with apoptotic resistance in CHO cells. Poster 161, Big Data 'Omics and New Technologies division, Cell Culture Engineering XIV, Quebec City, Canada. May 4–9, 2014.

[29] A. K. Leamy*, R. A. Egnatchik, M. Shiota, P. T. Ivanova, D. S. Myers, H. A. Brown, **J. D. Young**. Palmitate-induced alterations in phospholipid composition promote ER stress and cellular dysfunction in hepatic lipotoxicity. Paper 1001.2, Experimental Biology 2014, San Diego, CA. Apr 25–May 1, 2014.

[30] R. Nazarewicz*, A. Dikalova, A. Bikineyeva, R. A. Egnatchik, **J. D. Young**, D. Harrison, S. Dikalov. T cell mitochondrial ROS in development of hypertension. Paper 693.15, Experimental Biology 2014, San Diego, CA. Apr 25–May 1, 2014.

[31] Y. M. Whang*, S. I. Park, I. A Trenary, C. Lee, J. Kaufman, D. P. Carbone, **J. D. Young**. LKB1 deficiency enhances sensitivity to energetic stress induced by erlotinib treatment in non-small cell lung cancer (NSCLC) cells. Poster 1839, AACR Annual Meeting 2014, San Diego, CA, April 5–9, 2014.

[32] C. Lee, P. Campbell, Y. M. Whang, **J. D. Young**, F. Elefteriou, S. I. Park*. Targeting c-Met and VEGFR2 in the stromal compartment of prostate cancer bone metastasis. Poster 1172, AACR Annual Meeting 2014, San Diego, CA, April 5–9, 2014.

[33] L. J. Jazmin*, Y. Xu, A. O. Adebiyi, C. H. Johnson, **J. D. Young**. Isotopically nonstationary ^{13}C flux analysis of isobutyraldehyde production in *Synechococcus elongatus*. Paper 11327, 247th ACS National Meeting, Dallas, TX. Mar 16-20, 2014.

[34] L. J. Jazmin, Y. Xu, A. O. Adebiyi, C. H. Johnson, **J. D. Young***. Isotopically nonstationary ^{13}C flux analysis of isobutyraldehyde production in *Synechococcus elongatus*. 2014 DOE Genomic Science Contractors-Grantees Meeting XII, Arlington, VA. Apr 9–12, 2014.

[35] C. S. Duckwall*, **J. D. Young**. Metabolic rewiring induced by hyperactive Akt signaling in cancer cells. Paper 176e, AIChE 2013 Annual Meeting, San Francisco, CA. Nov 3–8, 2013.

[36] R. A. Egnatchik*, A. K. Leamy, D. Jacobson, M. Shiota, **J. D. Young**. Phosphoplipid alterations and ER calcium efflux promote metabolic dysfunction in the context of hepatic lipotoxicity. Paper 783b, AIChE 2013 Annual Meeting, San Francisco, CA. Nov 3–8, 2013.

[37] N. Templeton, A. Lewis, K. Smith, H. Dorai, S. Lang, M. J. Betenbaugh, **J. D. Young***. Redirection of glycolytic metabolism by overexpression of Bcl-2Δ in CHO cells. Paper 724a, AIChE 2013 Annual Meeting, San Francisco, CA. Nov 3–8, 2013.

[38] L. J. Jazmin*, F. Ma, D. K. Allen, **J. D. Young**. Isotopically nonstationary 13C flux analysis of *Arabidopsis thaliana* rosettes at varying light intensities. Paper 746f, AIChE 2013 Annual Meeting, San Francisco, CA. Nov 3–8, 2013.

[39] J. P. Fessel*, R. A. Egnatchik, E. Brittain, E. Hysinger, A. Shah, K. Monahan, M. Skala, **J. D. Young**, E. Austin, A. Hemnes, J. West. Glutamine addiction characterizes the metabolic shift in pulmonary arterial hypertension. Grover Conference on the Pulmonary Circulation, Sedalia, CO. Sep 4–8, 2013.

[40] L. J. Jazmin*, F. Ma, D. K. Allen, **J. D. Young**. Isotopically nonstationary ^{13}C flux analysis reveals quantitative phenotypes of *Arabidopsis thaliana* leaves at altered light conditions. Contributed Talks Session 2, 16th International Congress on Photosynthesis Research, St. Louis, MO. Aug 11–16, 2013.

[41] F. Ma*, L. J. Jazmin, **J. D. Young**, D. K. Allen. Quantification of Photosynthetic Metabolism in *Arabidopsis thaliana* Rosettes via Metabolic Flux Analysis. 16th International Congress on Photosynthesis Research, St. Louis, MO. Aug 11–16, 2013.

[42] L. J. Jazmin*, Y. Xu, A. O. Adebiyi, C. H. Johnson, **J. D. Young**. Mapping photoautotrophic metabolism of cyanobacteria by isotopically nonstationary ^{13}C flux analysis. Photosynthetic and Respiratory Metabolism III oral session, 11th Workshop on Cyanobacteria, St. Louis, MO. Aug 7–11, 2013.

[43] J. P. Fessel*, A. T. Shah, R. A. Egnatchik, M. C. Skala, **J. D. Young**, C. J. Kang, J. D. West. Increased glutamine metabolism is a key feature of the metabolic reprogramming in BMPR2 mutant pulmonary endothelium. Poster D36, American Thoracic Society International Conference, Philadelphia, PA. May 17–22, 2013.

[44] K. Hardeman*, **J. D. Young**, D. Tyson, V. Quaranta. Targeting altered redox metabolism in lapatinib-resistant breast cancer. Gordon Research Conference on Cell Growth and Proliferation 2013, West Dover, VT. Jun 22–23, 2013.

[45] A. K. Leamy*, R. A. Egnatchik, M. Shiota, **J. D. Young**. Modulating lipid fate controls lipotoxicity in palmitate-treated hepatic cells. Paper 1022.1, Experimental Biology 2013, Boston, MA. Apr 20–24, 2013. **Best poster award: Lipids and membranes theme.**

[46] R. A. Egnatchik*, A. K. Leamy, D. A. Jacobson, **J. D. Young**. Calcium promotes oxidative stress and metabolic dysfunction in lipotoxicity. Paper 834.7, Experimental Biology 2013, Boston, MA. Apr 20–24, 2013.

[47] D. K. Allen*, **J. D. Young**. Carbon and Nitrogen Provisions Alter the Metabolic Flux in Developing Soybean Embryos. National Center for Soybean Biotechnology Annual Symposium, Columbia, MO. Apr 10, 2013.

[48] D. K. Allen*, **J. D. Young**. Carbon and Nitrogen Provisions Alter the Metabolic Flux in Developing

Soybean Embryos. Gordon Research Conference, Plant Lipids: Structure, Metabolism & Function, Galveston, TX. Jan 27–Feb 1, 2013.

[49] *R. A. Egnatchik*, **J. D. Young***. Calcium stimulated metabolism promotes oxidative stress in hepatic lipotoxicity. Paper 760f, AIChE 2012 Annual Meeting, Pittsburgh, PA. Oct 28–Nov 2, 2012.

[50] *T. A. Murphy*, C. V. Dang, **J. D. Young***. Analysis of Myc-Driven metabolic reprogramming in B-cells by isotopically nonstationary 13C flux analysis. Paper 621h, AIChE 2012 Annual Meeting, Pittsburgh, PA. Oct 28–Nov 2, 2012.

[51] *L. J. Jazmin**, Y. Xu, C. H. Johnson, **J. D. Young**. Isotopically nonstationary 13C flux analysis of isobutyraldehyde production in *S. elongatus*. Paper 462h, AIChE 2012 Annual Meeting, Pittsburgh, PA. Oct 28–Nov 2, 2012.

[52] *A. K. Leamy*, **J. D. Young***. Modulating lipid fate controls lipotoxicity in palmitate-treated hepatic cells. Paper 309h, AIChE 2012 Annual Meeting, Pittsburgh, PA. Oct 28–Nov 2, 2012. (Not presented due to weather-related flight cancelation.)

[53] *N. Templeton*, A. Lewis, H. Dorai, K. Smith, S. Lang, M. J. Betenbaugh, **J. D. Young***. Quantifying the impact of Bcl-2Δ overexpression upon central metabolism through 13C metabolic flux analysis. Paper 199b, AIChE 2012 Annual Meeting, Pittsburgh, PA. Oct 28–Nov 2, 2012. (Not presented due to weather-related flight cancelation.)

[54] **J. D. Young***, A. A. Shastri, D. K. Allen, G. Stephanopoulos, J. A. Morgan. Mapping photoautotrophic metabolism with isotopically nonstationary ^{13}C flux analysis. Poster 141, Metabolic Engineering IX, Biarritz, France. June 3–7, 2012.

[55] *T. A. Murphy**, C. V. Dang, **J. D. Young**. Isotopically nonstationary ^{13}C flux analysis of Myc-induced metabolic reprogramming in B-cells. Poster 3, Metabolic Engineering IX, Biarritz, France. June 3–7, 2012.

[56] *N. Templeton**, J. Dean, P. Reddy, **J. D. Young**. Distinct metabolic phases of an industrial CHO cell fed-batch process characterized by ^{13}C flux analysis. Poster 138, Cell Culture Engineering XIII, Scottsdale, AZ. Apr 22–27, 2012.

[57] *T. A. Murphy**, **J. D. Young**. Surveying the metabolic response to c-Myc overexpression using ^{13}C flux analysis. Poster Session A, AACR Metabolism and Cancer Special Conference, Baltimore, MD. Oct 16–19, 2011.

[58] *J. K. Campos**, *T. A. Murphy*, **J. D. Young**. Pharmacological inhibition of tumor metabolism as anticancer treatment. Food, Pharmaceutical, and Biotechnology Poster Session, AIChE 2011 Annual Student Conference, Minneapolis, MN. Oct 14–17, 2011. **First place winner.**

[59] *T. A. Murphy*, **J. D. Young***. Effects of small-molecule inhibition of central metabolism in a B-cell lymphoma model of Myc-driven cancer. Paper 182f, AIChE 2011 Annual Meeting, Minneapolis, MN. Oct 16–21, 2011.

[60] *T. A. Murphy*, **J. D. Young***. Isotopically nonstationary proteinogenic MFA as a tool for analysis of tumor cell metabolism. Paper 197g, AIChE 2011 Annual Meeting, Minneapolis, MN. Oct 16–21, 2011.

[61] *R. A. Egnatchik**, **J. D. Young**. Mitochondrial dysfunction in hepatic lipotoxicity. Paper 593e, AIChE 2011 Annual Meeting, Minneapolis, MN. Oct 16–21, 2011.

[62] *N. Templeton**, **J. D. Young**. The metabolic effects of an anti-apoptotic protein Bcl-2Δ overexpressing CHO cell line. Paper 133c, AIChE 2011 Annual Meeting, Minneapolis, MN. Oct 16–21, 2011.

[63] *A. K. Leamy**, **J. D. Young**. A systems approach to identify metabolic pathways controlling hepatic lipotoxicity. Paper 182b, AIChE 2011 Annual Meeting, Minneapolis, MN. Oct 16–21, 2011.

[64] *N. Templeton**, H. Dorai, M. J. Betenbaugh, **J. D. Young**. Role of nutrient availability and Bcl-2Δ over-expression in controlling lactate accumulation by CHO cell cultures. Paper S117, SIM 2011 Annual Meeting, New Orleans, LA. Jul 24–28, 2011.

[65] *L. Aboulmouna**, M. Shiota, **J. D. Young**. Novel isotope tracer method for quantifying glucose metabolism in type-2 diabetes. Food, Pharmaceutical, and Biotechnology Poster Session, AIChE 2010 Annual Student Conference, Salt Lake City, UT. Nov 5–8, 2010. **Second place winner.**

[66] *J. K. Campos**, *T. A. Murphy*, **J. D. Young**. Pharmacological inhibition of tumor metabolism as anticancer treatment. Food, Pharmaceutical, and Biotechnology Poster Session, AIChE 2010 Annual Student Conference, Salt Lake City, UT. Nov 5–8, 2010. **Second place winner.**

[67] **J. D. Young***. Reactive oxygen species as intracellular second messengers. Paper 155e, AIChE 2010 Annual Meeting, Salt Lake City, UT. Nov 7–12, 2010.

[68] *N. Templeton**, **J. D. Young**. Role of anti-apoptotic proteins and nutrient availability in the lactate shift of CHO cell cultures. Paper 130c, AIChE 2010 Annual Meeting, Salt Lake City, UT. Nov 7–12, 2010.

[69] *T. A. Murphy**, **J. D. Young**. Role of redox balancing and reactive oxygen species in the metabolic phenotype of tumor cells. Paper 180d, AIChE 2010 Annual Meeting, Salt Lake City, UT. Nov 7–12, 2010.

[70] *R. A. Egnatchik**, **J. D. Young**. Uncoupling of central metabolism is responsible for palmitate-induced ROS accumulation and hepatic apoptosis. Paper 536b, AIChE 2010 Annual Meeting, Salt Lake City, UT. Nov 7–12, 2010.

[71] *N. Templeton**, **J. D. Young**. A systems approach to quantify and exploit metabolic reprogramming in anti-apoptotic CHO cells. Poster 56, Cell Culture Engineering XII, Banff, Canada. April 25–30, 2010.

[72] *L. Aboulmouna**, M. Shiota, **J. D. Young**. Novel isotope tracer method for quantifying glucose metabolism in type-2 diabetes. Food, Pharmaceutical, and Biotechnology Poster Session, AIChE 2009 Annual Student Conference, Nashville, TN. Nov 6–9, 2009. **First place winner.**

[73] **J. D. Young***. Metabolic flux determinants of hepatic lipotoxicity. Paper 283e, AIChE 2009 Annual Meeting, Nashville, TN. Nov 8–13, 2009.

[74] *T. A. Murphy**, S. Liu, M. Hossanein, V. Quaranta, **J. D. Young**. Metabolic reprogramming in tumor cells is modulated by integrin binding. Paper 202d, AIChE 2009 Annual Meeting, Nashville, TN. Nov 8–13, 2009.

[75] *T. A. Murphy**, S. Liu, M. Hossanein, V. Quaranta, **J. D. Young**. ^{13}C flux analysis of tumor cell metabolic adaptations and response to integrin binding. Poster B40, AACR Metabolism and Cancer Special Conference, La Jolla, CA. Sep 13–16, 2009.

Postdoctoral work

[76] **J. D. Young***, Y. Noguchi, J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos. Uncovering connections between metabolism and apoptosis: a flux analysis study of hepatic lipotoxicity. Session 6: Molecules to Macro Systems, SBE's 2nd International Conference on Biomolecular Engineering, Santa Barbara, CA. Jan 18–21, 2009.

[77] **J. D. Young***, Y. Noguchi, J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos. Unraveling the role of central metabolism in hepatic lipoapoptosis using ^{13}C flux analysis and comprehensive metabolic profiling. Paper 300c, AIChE 2008 Annual Meeting, Philadelphia, PA. Nov 16–21, 2008.

[78] **J. D. Young***, A. A. Shastri, G. Stephanopoulos, J. A. Morgan. Isotopically nonstationary ^{13}C flux analysis of *Synechocystis* photoautotrophic metabolism. Paper 12g, AIChE 2008 Annual Meeting,

Philadelphia, PA. Nov 16–21, 2008.

[79] **J. D. Young***. Blurring the line between rational and evolutionary approaches. Workshop I: Rational and Evolutionary Approaches for Metabolic Engineering, Metabolic Engineering VII, Puerto Vallarta, Mexico. Sep 14–19, 2008.

[80] Y. Noguchi, **J. D. Young***, J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos. An integrated flux analysis and metabolic profiling study to identify pathways causing hepatic lipoapoptosis. Poster 65, Metabolic Engineering VII, Puerto Vallarta, Mexico. Sept 14–19. 2008.

[81] Y. Noguchi*, Y. Hara, N. Shikata, J. O. Aleman, **J. D. Young**, S. Kurihara, M. Mori, S. Yoshida, J. K. Kelleher, M. Takahashi, G. Stephanopoulos. Manipulation of dietary essential amino acids prevents high-fat induced insulin resistance and non-alcoholic fatty liver. American Diabetes Association 68th Scientific Sessions, San Francisco, CA. Jun 6–10, 2008.

[82] Y. Noguchi*, Y. Hara, N. Shikata, J. O. Aleman, **J. D. Young**, S. Kurihara, M. Mori, S. Yoshida, J. K. Kelleher, M. Takahashi, G. Stephanopoulos. Manipulation of dietary essential amino acids prevents high-fat induced non-alcoholic fatty liver in mice. Experimental Biology 2008 ASBMB Annual Meeting, San Diego, CA. Apr 5–9, 2008.

[83] Y. Noguchi*, **J. D. Young**, J. O. Aleman, M. E. Hansen, J. K. Kelleher, G. Stephanopoulos. Identification and modulation of metabolic pathways causing hepatic lipoapoptosis: influence of amino acids. Molecular Medicine Tri-Conference, San Francisco, CA. Mar 25–28, 2008.

[84] **J. D. Young***, Y. Noguchi, A. A. Shastri, J. A. Morgan, G. Stephanopoulos. Nonstationary metabolic flux analysis of ^{13}C labeling dynamics. Paper 560d, AIChE 2007 Annual Meeting, Salt Lake City, UT. Nov 4–9, 2007.

[85] J. L. Walther*, **J. D. Young**, G. Stephanopoulos. Isotopically nonstationary metabolic flux analysis of *Saccharomyces cerevisiae*. Paper 180c, AIChE 2007 Annual Meeting, Salt Lake City, UT. Nov 4–9, 2007.

[86] A. A. Shastri, **J. D. Young**, G. Stephanopoulos, J. A. Morgan*. A nonstationary ^{13}C labeling approach for metabolic flux analysis in a photoautotrophic system. Paper 645c, AIChE 2007 Annual Meeting, Salt Lake City, UT. Nov 4–9, 2007.

[87] J. L. Walther*, **J. D. Young**, M. R. Antoniewicz, H. Yoo, G. Stephanopoulos. Isotopically nonstationary flux analysis using an elementary metabolite unit (EMU) framework. Paper BIOT-183, 234th ACS National Meeting, Boston, MA. Aug 19–23, 2007.

[88] **J. D. Young***, J. L. Walther, M. R. Antoniewicz, G. Stephanopoulos. Simultaneous estimation of reaction fluxes and metabolite levels using instationary ^{13}C metabolic flux analysis. Paper 484c, AIChE 2006 Annual Meeting, San Francisco, CA. Nov 12–17, 2006.

[89] **J. D. Young***, F. Bian, H. Brunengraber, G. Stephanopoulos, M. R. Antoniewicz, J. K. Kelleher. ^{13}C isotopic tracer analysis of hepatic azelate metabolism. Poster 65, Metabolic Engineering VI, Noordwijkerhout, The Netherlands, Oct 1–5. 2006.

[90] J. L. Walther*, M. R. Antoniewicz, **J. D. Young**, G. Stephanopoulos. An elementary metabolite unit (EMU) based method for instationary flux analysis. Poster 64, Metabolic Engineering VI, Noordwijkerhout, The Netherlands. Oct 1–5, 2006.

[91] C. Fischer*, **J. D. Young**, G. Stephanopoulos. Identifying gene targets for overexpression and knockout via in silico biology: application to tyrosine production in *Escherichia coli*. Poster 44, Metabolic Engineering VI, Noordwijkerhout, The Netherlands. Oct 1–5, 2006.

Doctoral work

[92] **J. D. Young***, K. L. Henne, J. A. Morgan, A. E. Konopka, D. Ramkrishna. A novel control-theoretic

approach for modeling metabolic networks and inferring pathway regulation. Paper 300a, AIChE 2008 Annual Meeting, Philadelphia, PA. Nov 16–21, 2008.

[93] **J. D. Young**, J. I. Kim, D. Ramkrishna, J. D. Varner*. On modeling metabolism. 1st International Conference on Biomolecular Engineering, San Diego, CA. Jan 14–18, 2007.

[94] D. Ramkrishna*, **J. D. Young**. Cybernetic models of metabolism. A dynamic framework for metabolic engineering. 19th International Symposium of Chemical Reaction Engineering (ISCRE-19), Potsdam, Germany. Sep 3–6, 2006.

[95] **J. D. Young**, D. Ramkrishna*. Maximizing the productivity of elementary flux modes as a surrogate description of metabolic regulation in cybernetic models. CHEMCON 2005, New Delhi, India. Dec 14–17, 2005.

[96] **J. D. Young***, D. Ramkrishna. Discovery and analysis of biological control laws. Paper 379b, AIChE 2005 Annual Meeting, Cincinnati, OH. Oct 30–Nov 4, 2005.

[97] **J. D. Young***, D. Ramkrishna. Cybernetic modeling approach for analysis and redesign of biochemical pathways. Paper 479b, AIChE 2005 Annual Meeting, Cincinnati, OH. Oct 30–Nov 4, 2005.

[98] **J. D. Young***, D. Ramkrishna. Elementary modes and cybernetic mechanisms: a systems-level approach for modeling biological regulation. Paper 504a, AIChE 2005 Annual Meeting, Cincinnati, OH. Oct 30–Nov 4 2005.

[99] **J. D. Young**, D. Ramkrishna*. The evolution of cybernetic models. U.S. India Joint AIChE/IIChE Conference, Mumbai, India. Dec 28–30, 2004.

[100] **J. D. Young***, D. Ramkrishna. Cybernetic model-based analysis and redesign of biochemical networks. Paper 457q, AIChE 2004 Annual Meeting, Austin, TX. Nov 7–12, 2004.

[101] **J. D. Young***, D. Ramkrishna. Cybernetic modeling analysis of metabolic phenotypes. Poster B-55, Metabolic Engineering V, Lake Tahoe, CA. Sep 19–23, 2004.

[102] **J. D. Young***, K. L. Henne, J. A. Morgan, A. E. Konopka, D. Ramkrishna. Cybernetic modeling of metabolism: towards a framework for rational design of recombinant organisms. 18th International Symposium of Chemical Reaction Engineering (ISCRE-18), Chicago, IL. Jun 6–9, 2004.

[103] **J. D. Young***, J. A. Morgan, A. E. Konopka, D. Ramkrishna. A systematic treatment of (local and global) cybernetic variables in models of metabolism. Paper 464b, AIChE 2003 Annual Meeting, San Francisco, CA. Nov 16–21, 2003.

[104] **J. D. Young***, J. A. Morgan, A. E. Konopka, D. Ramkrishna. Rational design of recombinant organisms by the cybernetic modeling approach. Paper 213g, AIChE 2003 Annual Meeting, San Francisco, CA. Nov 16–21, 2003.

[105] **J. D. Young***, J. A. Morgan, A. E. Konopka, D. Ramkrishna. The cybernetic modeling approach to metabolic engineering: preliminary investigation of *E. coli* fermentation. Paper 314i, AIChE 2002 Annual Meeting, Indianapolis, IN. Nov 3–8, 2002.

5 Teaching

Courses Taught

CHBE 4500/5500 Bioprocess Engineering **Fall 2015**
Elective, Dual Undergrad/Grad Level
31 students

CHBE 282 Metabolic Engineering **Spring 2015**
Elective, Dual Undergrad/Grad Level
19 students

CHBE 283 Bioprocess Engineering **Fall 2014**
Required, Senior Level
37 students

CHBE 180 Modeling and Simulation in Chemical Engineering **Spring 2014**
Required, Sophomore Level
53 students

CHBE 283 Bioprocess Engineering **Fall 2013**
Required, Senior Level
50 students

CHBE 282 Metabolic Engineering **Spring 2013**
Elective, Dual Undergrad/Grad Level
21 students

CHBE 283 Bioprocess Engineering **Fall 2012**
Required, Senior Level
36 students

CHBE 180 Modeling and Simulation in Chemical Engineering **Spring 2012**
Required, Sophomore Level
58 students

CHBE 283 Bioprocess Engineering **Fall 2011**
Required, Senior Level
50 students

CHBE 282 Biochemical Engineering **Spring 2011**
Elective, Dual Undergrad/Grad Level
11 students

CHBE 283 Bioprocess Engineering **Fall 2010**
Required, Senior Level
45 students

CHBE 180 Modeling and Simulation in Chemical Engineering **Spring 2010**
Required, Sophomore Level
54 students

CHBE 290 Special Topics: Metabolic Engineering **Fall 2009**
Elective, Dual Undergrad/Grad Level
13 students
Newly introduced course

CHBE 225 Chemical Reaction Engineering **Fall 2008**
Required, Senior Level
39 students

Contributed Lectures

M&IM 332 Foundations in Microbiology and Immunology III **Spring 2016**
Lead Instructor: Prof. Borden Lacy
Presented one lecture on metabolic flux analysis followed by discussion of research topics.

CANB 347 Cancer Systems Biology **Spring 2011–2012**
Lead Instructor: Prof. Lourdes Estrada
Presented two/three lectures on modeling cancer cell metabolism each spring semester.

MP&B 328 Metabolic Regulation In Vivo **Fall 2008–2010**
Lead instructor: Prof. Masa Shiota
Presented one lecture on isotopomer analysis of glucose metabolic fluxes each fall semester.

Research Training

Postdoctoral Scholars

Yi Ern (Ian) Cheah 2015–present
Metabolic Engineering of Cyanobacteria for Biofuel Production

Clinton Hasenour 2015–present
In Vivo 2H/13C Metabolic Flux Analysis of NASH Pathogenesis

Young Mi Whang 2012–2015
Regulation of Cell Metabolism by LKB1 Tumor Suppressor
Current position: Research Professor at Chung-Ang University, Seoul, Korea

Graduate Students

Taylor Murphy, CHBE PhD (2013) 2008–2013
Metabolic Mapping of Myc-induced Lymphoma Models Using Isotopically Nonstationary ^{13}C Flux Analysis
Current position: Data Scientist at NextGxDx, Franklin, TN

Rob Egnatchik, CHBE PhD (2014) 2009–2014
Metabolic Determinants of Hepatic Lipotoxicity
Current position: Postdoctoral Researcher at UT Southwestern Medical Center, Dallas, TX

Neil Templeton, CHBE PhD (2014) 2009–2014
^{13}C Metabolic Flux Analysis of Recombinant Chinese Hamster Ovary (CHO) Cell Cultures
Current position: Senior Scientist at Merck, Kenilworth, NJ

Alexandra Leamy, CHBE PhD (2015) 2010–2015
Role of Lipid Metabolic Pathways in the Progression of Hepatic Lipotoxicity
Current position: Deloitte Consulting

Lara Jazmin, CHBE PhD (2015) 2010–2015
Mapping Photoautotrophic Metabolism of Cyanobacterial and Plant Systems with Isotopically Nonstationary ^{13}C Metabolic Flux Analysis
Current position: President of MetaMap Bioworks, Nashville, TN

Casey Duckwall, CHBE PhD candidate 2011–2014
Metabolic Flux Analysis of Tumor Cells

Adeola Adebiyi, CHBE MS (2015) 2012–2015
Metabolic Engineering of Cyanobacteria for Increased Product Formation

Ali McAtee, CHBE PhD candidate 2012–present
Metabolic Flux Analysis of CHO Cells

Martha Wall, CPB MS candidate 2012–present
Novel Stable Isotope Methods to Quantify Glucose Metabolism

Vanderbilt Undergraduate Researchers

Mushfik Rahman 2015–present

Victoria Potter 2013–present

Elaine Qian 2012–2013
Current position: UCLA Bioengineering PhD program

Jessica Campos 2010–2012
Current position: Loyola University MD program

Yiyi "Judy" Zhu 2010–2011
Oluwamayowa "Mayo" Adigun 2011
Current position: Purdue Chemical Engineering PhD program
Lina Aboulmouna (Honors program) 2009–2011
Current position: Cornell Chemical and Biomolecular Engineering PhD program
Peter DelNero (Honors program) 2009–2011
Current position: Cornell Biomedical Engineering PhD program

NSF REU students

Brooke Olesnevich, NC State University 2015
Jacklyn Whitehead, Cal Lutheran University 2012
Current position: UC-Riverside Bioengineering PhD program

Student Research Training Program (SRTP) in Diabetes and Endocrinology

Kaleb Kohler, University of Cincinnati 2012
Nicolina Wawrin, University of Toledo 2011
Brendan Inouye, University of Hawaii 2010

High School Students

Bader Mohammed 2015
Aaron Oates 2016

6 Service

Reviewing and Editorial Service

Grant Review Panels

NSF Biomedical Engineering Program	2008
NSF Biotechnology, Biochemical, and Biomass Engineering Program	2011
Kentucky Science & Engineering Foundation	2011
DOE Office of Science Graduate Fellowship Program	2012
NSF-NCI Physical and Engineering Sciences in Oncology Program	2012
AAAS WIRC Program for Minority Serving Institutions	2012
Fonds de la Reserche Luxembourg CORE program	2014
DOE Office of Science Early Career Research Program (BER-BSSD)	2015

Journal Reviewer

ACS Central Science
AIChE Journal
Analytical Chemistry
Biochemical Engineering Journal
Biophysical Journal
Bioprocess and Biosystems Engineering
Biotechnology Advances
Biotechnology and Bioengineering
Biotechnology Journal
Biotechnology Progress
BMC Biotechnology
BMC Systems Biology
Cancer and Metabolism
Cell Reports
Critical Reviews in Oncology/Hematology
Current Opinion in Biotechnology
Current Pediatric Reviews
Industrial & Engineering Chemistry Research
Journal of Biological Chemistry
Journal of Biotechnology
Journal of Industrial Microbiology & Biotechnology
Journal of Nutritional Biochemistry
Journal of the Royal Society Interface
Liver International
Metabolic Engineering
Metabolic Engineering Communications
Metabolites
Molecular BioSystems
Nature
Nature Communications
Nutrition and Metabolism
Plant Physiology
PLoS Computational Biology
PLoS ONE
Trends in Biotechnology

Journal Editor

Journal of Biomedicine and Biotechnology 2010
Special issue on "Computational Approaches in Metabolic Engineering"
Current Opinion in Biotechnology 2014
Special issue on "Pharmaceutical Biotechnology"

Service to the Scientific Community

Membership in Professional Societies

American Institute of Chemical Engineers (AIChE), Senior Member
Society for Biological Engineers (SBE)
International Metabolic Engineering Society (IMES)
International Society of Photosynthesis Research (ISPR)
American Diabetes Association (ADA)
Tau Beta Pi Engineering Honor Society

Conference Organization

Cell Culture Engineering XV, La Quinta (Palm Springs), CA May 8–13, 2016
Organizing Committee
Session VIII: Current Concerns and Emerging Trends in Cell Culture Bioprocessing (Chair)
Biochemical and Molecular Engineering XIX, Puerto Vallarta, Mexico Jul 12–16, 2015
Session XII: Disease Models (Chair)

AIChE 2014 Annual Meeting, Atlanta, GA — Nov 16–21, 2014
Session #52 Cell Culture I: Process and Media Design (Co-chair)
Session #118 Cell Culture II: Host Cell Engineering, Screening, and Scale-Down Models (Co-chair)
Session #264 *In silico* Systems Biology: Cellular and Organismal Models (Co-chair)

Metabolic Engineering X, Vancouver, Canada — Jun 15–19, 2014
Systems Biology and Engineering (Chair)

AIChE 2013 Annual Meeting, San Francisco, CA — Nov 3–8, 2013
Session #490 *In silico* Systems Biology: Cellular and Organismal Models I (Chair)
Session #547 *In silico* Systems Biology: Cellular and Organismal Models II (Co-chair)
Session #597 Cell Culture I: Process and Media Design (Chair)
Session #660 Cell Culture II: Host Cell Engineering, Screening, and Scale-Down Models (Co-chair)

AIChE 2012 Annual Meeting, Pittsburgh, PA — Oct 28–Nov 2, 2012
Session #199 Cell Culture II: Metabolic Flux Analysis and Modeling (Chair)

Cell Culture Engineering XIII, Scottsdale, AZ — Apr 22–27, 2012
Session #8 Control and Optimization of Cell Metabolism in Culture (Co-chair)

AIChE 2011 Annual Meeting, Minneapolis, MN — Oct 16–21, 2011
Session #448 Drug Delivery I (Chair)

AIChE 2010 Annual Meeting, Salt Lake City, UT — Nov 7–12, 2010
Session #667 Proteomic and Metabolic Approaches to Systems Biology (Chair)
Session #464 Experimental Approaches in Systems Biology I (Co-chair)

Metabolic Engineering VII, Puerto Vallarta, Mexico — Sep 14–19, 2008
Workshop #1 Rational and Evolutionary Approaches for Metabolic Engineering (Co-chair)

AIChE 2007 Annual Meeting, Salt Lake City, UT — Nov 4–9 2007
Session #645 Quantitative Metabolic Phenotyping in Plant and Animal Systems (Chair)

Other

School of Chemical Engineering Strategic Planning Committee, Purdue University — 2014

School of Chemical Engineering Centennial Celebration, Purdue University — Oct 7, 2011
Invited academic panelist

Service to Vanderbilt University

University-wide

Chancellor's Biomedical Sciences Advisory Committee	2015–present
Vanderbilt Institutional Biosafety Committee (IBC)	2015–present
Faculty Adviser to Graduate Honor Council Hearing	Dec 9, 2014

School of Engineering

School of Engineering Safety Committee	2009–present

Chemical and Biomolecular Engineering Department

Director of Graduate Recruiting	2015–present
Faculty Search Committee	2014–2015
Class of 2017 Undergraduate Adviser	2013–present
Graduate Committee	2009–present
Class of 2013 Undergraduate Adviser	2009–2013

Internal Grant Review Panels

Vanderbilt International Office Research Grants	2011
Vanderbilt Diabetes Research and Training Center, Pilot and Feasibility Grants	2011
Vanderbilt Provost's Graduate Fellowship (PGF) Awards	2014
Vanderbilt Dissertation Enhancement Grants	2014
Vanderbilt Global Summer Fellowship Program	2015

Thesis Committees

Bing Li, CHBE PhD (2010)	2008–2010
Jill Mecklenborg, BME MS (2011)	2010–2011
Ken Drake, MP&B PhD (2015)	2009–2015

Margarita Prieto, CHBE PhD (2013)	2010–2013
Elizabeth Adolph, CHBE PhD (2014)	2011–2014
Lili Gai, CHBE PhD (2014)	2011–2014
Fredrick Harris, Meharry Medical College Biochemistry PhD (2014)	2011–2014
Jaime Hutton, Biochemistry PhD student	2012–present
Drew Harmata, CHBE PhD (2015)	2012–2015
Ruijing Guo, CHBE PhD (2015)	2012–2015
Juan Carlos Cordova, CHBE PhD student	2012–present
Alex Walsh, BME PhD (2015)	2013–2015
Keisha Hardeman, CANB PhD student	2013–present
Harris Manning, CHBE PhD student	2013–present
Sichang Lu, CHBE PhD student	2014–present
Siyuan Yang, CHBE MS (2015)	2014–2015
Yinnian Feng, CHBE PhD student	2014–present

Outreach Activities

Vanderbilt Student Volunteers for Science (VSVS)

Developed hands-on science lesson for middle-school students entitled "Power of Food". Lesson plan and training presentation publicly available at http://studentorgs.vanderbilt.edu/vsvs/lessons.html

Nashville's Adventure Science Center (ASC)

"CHOMP!" (Food science day) lab demonstration	Jul 30, 2011
"Chemistry Day" lab demonstration	Oct 22, 2011
"Energy and Metabolism" science lab for home school students	Feb 29, 2012
"CHOMP!" (Food science day) lab demonstrations (4 total)	Jul 21, 2012
"CHOMP!" (Food science day) lab demonstrations (2 total)	Jul 27, 2013

NSF Research Experiences for Teachers (RET)

Invited lecture "Metabolic Engineering and Systems Biology" — Jun 7, 2010

U.S. Green Building Council–Middle Tennessee Chapter

Invited panelist "What is the Future of Energy?" — Mar 22, 2013

USDA Foreign Agricultural Service–Cochran Fellowship Program

Invited lecture "Metabolic Engineering and Systems Biology" — Jul 9, 2013