Praveen Kolar
Assistant Professor (80% Research and 20% Teaching)
Biological and Agricultural Engineering
North Carolina State University
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1. EDUCATION

Ph. D., 2008, Biological and Agricultural Engineering, University of Georgia
- *Low-temperature catalytic oxidation of volatile organic compounds using novel catalysts*

M. S., 2004, Biological and Agricultural Engineering, Louisiana State University
Minor: Experimental Statistics
- *Design and development of a process control temperature system for eastern oyster Crassostrea virginica research*

M.Tech., 1995, Aquacultural Engineering, Indian Institute of Technology, India
- *Vermicomposting of household wastes for use in aquaculture*

B. Tech., 1991, Civil Engineering, Sri Venkateswara University, India

2. ACADEMIC AND INDUSTRIAL EXPERIENCE

August 2008-Present, Assistant Professor-Agricultural Waste Management Engineering, Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC

August 2004-July 2008, Graduate Research Assistant, Biological and Agricultural Engineering, University of Georgia, Athens, GA

August 2002-August 2004, Graduate Research Assistant, Biological and Agricultural Engineering, Louisiana State University, Baton Rouge, LA.

April 1997-August 2002, Technical Manager, Navayuga Exports Limited, Bhubaneswar, India.

February 1995-March 1997, Project Engineer, Navayuga Exports Limited, Bhubaneswar, India

3. AWARDS AND HONORS

- Institute of Biological Engineering Presidential Citation, 2008-2012.
- Featured (Spotlight) in University of Georgia Magazine, Fall 2011.
- North Carolina State University faculty research and professional development award 2009 and 2011.
- One of the two finalists (from NCSU) nominated for Ralph E. Powe Junior Faculty Enhancement Award, 2009 and 2010.
- The University of Georgia emerging leaders 2007.
- Best abstract award, Louisiana Chapter of American Fisheries Society 25th Annual Meeting, Baton Rouge, LA, March 2004.
- The government of India, Graduate Aptitude Test in Engineering (GATE) award, 1993-1995.

4. REFEREED PUBLICATIONS (*indicates graduate student/research engineer supervised by Kolar)

4. A REFEREED PUBLICATIONS (PUBLISHED)

1. Das, L*., **P. Kolar**, J. J Classen, and J. A. Osborne. 2013. Adsorbents from pine wood via K_2CO_3-assisted low temperature carbonization for adsorption of *p*-cresol. *Industrial Crops and Products*, 45: 215-222.

2. Das, L*., **P. Kolar**, J. A. Osborne, and J. J Classen. 2012. Adsorption of *p*-cresol on granular activated carbon. *Agricultural Engineering International*: *CIGR Journal,* 14(4): 37-49.

3. Mbaneme-Smith, V*., **P. Kolar**, M. D. Boyette, M. Chinn, C. Smith, R. Gangadharan, and G. Zhang. 2012. Advanced oxidation of toluene using Ni-olivine catalysts: part 2. Toluene oxidation kinetics and mechanism of Ni-olivine catalysts synthesized via electroless deposition and thermal impregnation. *Transactions of American Society of Agricultural and Biological Engineers,* 55(6): 2273-2283.

4. Mengchen Yin*., R. H. Natelson, A. A. Campos, **P. Kolar**, and W. L. Roberts. 2012. Aromatization of *n*-octane over Pd/C catalysts. *Fuel,* 103: 408-413.

5. Shah, S. B., and **P. Kolar**. 2012. Evaluation of additive for reducing gaseous emissions from swine waste. *Agricultural Engineering International*: *CIGR Journal,* 14(2): 10-20.

6. **Kolar, P**., S. B. Shah, and C. D. Love. 2012. Feasibility of extracting ammonia from broiler litter and scale-up considerations. *Applied Engineering in Agriculture,* 28(4): 577-582.

7. Mbaneme-Smith, V[*]., **P. Kolar**, M. D. Boyette, M. Chinn, C. Smith, R. Gangadharan, and G. Zhang. 2012. Advanced oxidation of toluene using Ni-olivine catalysts: part 1. Synthesis, characterization, and evaluation of Ni-olivine catalysts for toluene oxidation. *Transactions of American Society of Agricultural and Biological Engineers,* 55(3): 1013-1024.

8. Saidu, M. M., S. G. Hall, **P. Kolar**, R. Schramm, and T. Davis. 2012. Efficient temperature control in recirculating aquaculture tanks. *Applied Engineering in Agriculture,* 28(1): 161-167.

9. Das, L[*]., **P. Kolar**, and R. S-Shivappa. 2012. Heterogeneous catalytic oxidation of lignin into value-added chemicals. *Biofuels,* 3(2):155-166.

10. Jairam, S[*]., **P. Kolar**, R. S-Shivappa, J. A. Osborne, and J. Davis. 2012. KI-impregnated oyster shell as a solid catalyst for soybean oil transesterification. *Bioresource Technology,* 104: 329-335.

11. Love, C. D[*]., **P. Kolar**, J. J. Classen, and L. Das. 2011. Adsorption of ammonia on ozonated activated carbon. *Transactions of American Society of Agricultural and Biological Engineers,* 54(5): 1931-1940.

12. **Kolar, P**., and J.R. Kastner. 2010. Low-temperature catalytic oxidation of aldehyde mixtures using wood fly ash: kinetics, mechanism, and effect of ozone. *Chemosphere,* 78: 1110-1115.

13. **Kolar, P**., and J.R. Kastner. 2009. Room-temperature oxidation of propanal using catalysts synthesized by electrochemical deposition. *Transactions of American Society of Agricultural and Biological Engineers*, 52(4): 1337-1344.

14. Kastner. J.R., J. Miller, **P. Kolar**, and K.C. Das. 2009. Catalytic ozonation of ammonia using biomass char and wood fly ash. *Chemosphere,* 75(6): 739-744.

15. Kastner, J.R., R. Gangavaram, **P. Kolar**, C. Xu, and A. Teja. 2008. Catalytic ozonation of propanal using wood fly ash and metal oxide nanoparticle impregnated carbon. *Environmental Science and Technology*, 42(2): 556–562.

16. Wang, L., **P. Kolar**, J.R. Kastner, and B. Herner. 2008. Biofiltration kinetics of a gaseous aldehyde mixture using a synthetic matrix. *Journal of Air and Waste Management Association,* 58 (3): 412-23.

17. **Kolar,** P., J.R. Kastner, and J. Miller. 2007. Low temperature catalytic oxidation of aldehydes using wood fly ash and molecular oxygen. *Applied Catalysis. B: Environmental*, 76: 203-217.

4. B. REFEREED MANUSCRIPTS (IN REVISION)

18. Jairam, S[*]., **P. Kolar**, R. S. Sharma-Shivappa, and J. A. Osborne. 2012. Synthesis of solid acid catalyst from tobacco stalks for esterification of oleic acid (*In revision*). *Applied Engineering in Agriculture.*

4. C. REFEREED MANUSCRIPTS (IN REVIEW)

19. Athalye, S., R. S-Shivappa, S. Peretti., **P. Kolar**, and J. Davis. Producing biodiesel from cotton seed oil using R. *oryzae* ATCC #34612 whole cell biocatalysts: culture media and cultivation period optimization. Energy for Sustainable Development (*In review*; submitted: 10/26/12).

20. Yane Ansanay, Y., **P. Kolar[*], ** R.S-Shivappa, and J. Cheng. Niobium oxide catalyst for delignification of switchgrass for fermentable sugar production (*In review, Bioresource Technology*).

5. CONFERENCE/PROCEEDINGS PAPERS

1. Mbaneme, V.[*], and **P. Kolar**. 2010. Catalytic ozonation of air pollutants from swine farming operations. In Proc. International Symposium on Air Quality and Manure Management for Agriculture September 13-16, 2010 Dallas, Texas, USA.

2. Hood, M., S. B. Shah, **P. Kolar**, and L. F. Stikeleather. Design and operation of a biofilter for treatment of swine house pit ventilation exhaust. In 2011 ASABE Annual International Meeting, Louisville, KY, August 7-10, 2011**.**

6. RESEARCH PRESENTATIONS ([*]indicates graduate student/research engineer supervised by Kolar)

1. A. Cureton, A, H. Hoggard, K. Njoroge, S. Lahmira, and S. Stone. Novel swine barn exhaust air treatment (Faculty mentors: Sanjay Shah and **Praveen Kolar**). The ASABE Annual International Meeting, Dallas, TX, July 29 - August 1, 2012

2. Y. Ansanay[*], **P. Kolar**, R. Sharma-Shivappa, and J. J. Cheng. Pretreatment of switchgrass using solid niobium acid catalysts. The ASABE Annual International Meeting, Dallas, TX, July 29 - August 1, 2012.

3. S. Athalye, R. Sharma-Shivappa, **P. Kolar**, J. Davis, and S. Peretti. Enzymatic production of biodiesel form cottonseed oil using *Rhizopus oryzae* whole cell biocatalysts: effect of acyl acceptor type, amount, and moisture content. The ASABE Annual International Meeting, Dallas, TX, July 29 - August 1, 2012. Poster no. 121338058.

4. A. Panneerselvam, R. Sharma-Shivappa, **P. Kolar**, and T. Ranney. Optimization of alkaline pretreatment for energy canes. The ASABE Annual International Meeting, Dallas, TX, July 29 - August 1, 2012. Poster no. 121338061.

5. L. Das*, **P. Kolar,** and R. Sharma-Shivappa. Catalytic oxidation of lignin into value-added aromatics. Center for Bioenergy Research and Development, Industry Advisory Board Meeting, Raleigh, NC. May 15-16, 2012.

6. A. Paneerselvam, R. Sharma-Shivappa, **P. Kolar**, T. Ranney, and S. Peretti. Ozonolysis- a novel pretreatment method to delignify energy canes. Poster. 33rd Symposium on Biotechnology for Fuels and Chemicals, Seattle, WA. May 2-5, 2011.

7. W. L. Roberts, A. Campos, K. Bagian, and **P. Kolar**. Conversion of lipids to green Diesel, Gasoline, and Jet Fuel Using Decarboxylation. Poster. National Alliance for Advanced Biofuels and Bioproducts (NAABB) Industrial Advisory Board Meeting, Denver, CO, May 11-13 2011.

8. R. Sharma-Shivappa, **P. Kolar**, T. Ranney, and S. Peretti. Development of novel oxidative pretreatment technologies for lignocellulosic ethanol production. Center for Bioenergy Research and Development, Industry Advisory Board Meeting, Honolulu, HI. June 2-3, 2011.

9. V. Mbaneme* (Faculty adviser: **P. Kolar**). Oxidation of biomass-derived tars using Ni-Olivine catalysts synthesized via electroless deposition. The ASABE Annual International Meeting, Louisville, KY, August 7-10, 2011.

10. S. Athalye, R. Sharma-Shivappa, **P. Kolar**, and S. Peretti. Impact of acyl acceptor choice and ratio on biodiesel production using Rhizopus oryzae whole cell biocatalysts. The ASABE Annual International Meeting, Louisville, KY. August 7-10, 2011. Poster no. 1110874.

11. **P. Kolar** and R. Sharma-Shivappa Catalytic Oxidation of Lignin into Value-Added Aromatics. Center for Bioenergy Research and Development Industrial Advisory Board meeting, Denver, CO, Nov 4-5, 2011.

12. V. Mbaneme* (Faculty mentor: **P. Kolar**). Synthesis, characterization, and testing of Ni-olivine catalysts for oxidation of biomass-derived tars. Sixth annual graduate student research symposium, North Carolina State University, Raleigh, NC, March 21, 2011.

13. S. Jairam*, and **P. Kolar**. Inexpensive solid base catalysts for biodiesel production. Institute of Biological Engineering Annual Conference, Boston, MA, March 5-7, 2010.

14. S. Jairam*., and **P. Kolar**. Stable solid base catalysts for biodiesel production. American Society of Agricultural Engineers (ASABE) Annual International Meeting, Pittsburgh, PA, June 19-23, 2010.

15. V. Mbaneme*, and **P. Kolar**, Cracking of tars over olivine-nickel catalysts synthesized by electrochemical deposition. The ASABE Annual International Meeting, Pittsburgh, PA, June 19-23, 2010.

16. V. Mbaneme*, and **P. Kolar**, Catalytic ozonation of gaseous pollutants from swine manure storage pits. The ASABE Annual International Meeting, Pittsburgh, PA, June 19-23, 2010.

17. A. Panneerselvam, R. Sharma-Shivappa, and P. Kolar. Effect of ozonolysis on bioconversion of miscanthus to ethanol. The ASABE Annual International Meeting, Pittsburgh, PA, June 19-23, 2010.

18. V. Mbaneme*., and **P. Kolar**, Catalytic ozonation of air pollutants from swine farming operations. International Symposium on Air Quality and Manure Management for Agriculture, Dallas, TX, September 13-16, 2010.

19. **P. Kolar**, J. Miller, and J. R. Kastner. Catalytic ozonation of odorous volatile organic compounds. Institute of Biological Engineering Annual Conference, Santa Clara, CA, March 19-22, 2009.

20. **P. Kolar,** and J. R. Kastner. Low temperature catalytic oxidation of volatile organic compounds mixture using wood fly ash and oxygen, Institute of Biological Engineering Annual Conference, Chapel Hill, NC, March 8-10, 2008.

21. **P. Kolar,** J. R. Kastner, and J. Miller. Catalytic ozonation of volatile organic compounds using wood fly ash, American Society of Agricultural and Biological Engineers Annual Meeting, Minneapolis, MN, June 17-20, 2007.

22. **P. Kolar,** and J. R. Kastner. Catalytic oxidation of volatile organic compounds using wood fly ash, Institute of Biological Engineering Annual Conference, St. Louis, MO, March 30-April 1, 2007.

23. **P. Kolar,** and J. R. Kastner. Catalytic oxidation of volatile organic compounds using metal oxides and wood fly ash, Georgia Association of Water Professionals Annual Meeting, Atlanta, GA, March 14-15, 2007.

24. **P. Kolar**, R. Gangavaram, J. R. Kastner, C. Xu, and A. Teja. Catalytic ozonation of propanal using metal nano-particle impregnated carbon, American Society of

Agricultural and Biological Engineers Annual Meeting, Portland, OR, July 9-12, 2006.

25. **P. Kolar,** and J. R. Kastner. Advanced environmental catalysts from biomass, Institute of Biological Engineering Annual Conference, Tucson, AZ, March 9-12, 2006.

26. **P. Kolar,** and J. R. Kastner. Enhanced air pollution control by coupling catalytic ozonation and biofiltration, Institute of Biological Engineering Annual Conference, Tucson, AZ, March 9-12, 2006.

27. S. Hall and **P. Kolar**. Design and development of variable temperature control in recirculating oyster culture systems, The Fifth International Conference on Recirculating Aquaculture, Roanoke, VA, July 22-25, 2004.

28. **P. Kolar,** and S. G. Hall. Design and testing of an automated temperature control system for conditioning aquatic species, Institute of Biological Engineering Annual Conference, Fayetteville, AR, January 9-11, 2004.

29. **P. Kolar**, and S. G. Hall. Use of a temperature control system for cell proliferation studies on eastern oyster *Crassostrea virginica*, Louisiana Chapter of American Fisheries Society 25th Annual Meeting, Baton Rouge, LA, February 2004.

30. **P. Kolar**, and S. G. Hall. Instrumentation in aquaculture systems, Annual meeting of Audubon Center for Endangered Species Research, New Orleans, LA, August 12, 2003.

7. OTHER INVITED PRESENTATIONS

31. Catalysis in Waste Management, North Carolina State University Department of Forest Biomaterials, Raleigh, NC, September 21, 2011.

32. Leadership skills for new faculty: Panelist speaker at the University of Georgia's Future leader's program, Helen, GA, October 30, 2009.

33. First year on Tenure Track: Panelist speaker at the University of Georgia Biological and Agricultural Engineering, Athens, GA, Dec 4, 2008.

34. An overview of shrimp aquaculture in India: Invited speaker at Louisiana State University Biological and Agricultural Engineering, Baton Rouge, LA, September 28, 2002.

8. TECHNOLOGICAL INNOVATION

1. *Pretreatment of switchgrass using niobium oxide catalysts.* Inventors: Praveen Kolar Ratna, Ratna Sharma-Shivappa, and Yane Ansanay. File # 12146. N C State University Office of Technology Transfer.

2. *Novel catalysts for selective oxidation of methane into value added chemicals.* Inventors: Gourishankar Karoshi and Praveen Kolar. File # 13092. N C State University Office of Technology Transfer.

3. *Ozonolysis of miscanthus varieties for production of fermentable sugars.* Inventors: Ratna Sharma-Shivappa, Praveen Kolar**,** and Anushadevi Paneerselvam. File # 11-007. N C State University Office of Technology Transfer.

4. *Nanostructured Carbon Supported Industrial Catalysts Synthesized by Electrochemical Deposition.* Inventors: James Kastner and Praveen Kolar. File # 1469. The University of Georgia Research Foundation.

9. RESEARCH INTERESTS AND SPECIALIZATION

- Conversion of agricultural wastes into energy and value-added products
    - Synthesis of novel catalysts and adsorbents from agricultural wastes for biofuel and environmental applications.
    - Selective catalytic oxidation of lignin into aromatic chemicals.
    - Catalytic conversion of methane into platform chemicals
    - Mitigation of volatile organic compounds via selective adsorption.
    - Valorization of manure into synthesis gas and biochar.

10. SCHOLARSHIP IN THE REALMS OF FACULTY RESPONSIBILITY

10. A. Research accomplishments

Since 2008, I had initiated several projects on converting agricultural wastes into energy and value-added products including novel heterogeneous catalysts and adsorbents. A short summary of projects are presented below:

1. Ammonia adsorbents from agricultural biomass: My team evaluated chemically modified activated carbon synthesized from various agricultural biomasses to adsorb ammonia from

aqueous phase. Our research has indicated that ammonia adsorption on activated carbon can be increased by up to 60% via ozonation. The research has potential applications in mitigating ammonia emissions from animal feeding operations.

Research Team: Praveen Kolar (NCSU BAE), John Classen (NCSU BAE), and Chris Love (Research Engineer).

Status: Completed

Deliverables: One referred publication.

2. Agricultural wastes as potential catalysts for biodiesel production: I have investigated oyster shell, KI-impregnated oyster shells, and sulfonic acid-impregnated tobacco char as heterogeneous catalysts supports for biodiesel production. Our results indicated a high activity for all catalysts tested. Our research has the potential to add value to agricultural wastes that are otherwise discarded.

Research Team: Praveen Kolar (NCSU BAE), Jason Osborne (NCSU Statistics), Ratna Sharma-Shivappa (NCSU BAE), and Suguna Jairam (Graduate Student).

Status: Completed.

Deliverables: (1) Master's thesis (Ms. Suguna Jairam) and (2) Two referred publications.

3. Extraction of ammonia from poultry houses for value added production: In this project, I (along with Dr. Sanjay Shah) successfully converted ammonia (from an experimental poultry facility) into ammonium phosphate, which could potentially be used as a fertilizer and flame retardant.

Research Team: Praveen Kolar (NCSU BAE), Sanjay Shah (NCSU BAE), and Chris Love (Graduate Student).

Status: Completed,

Deliverables: One referred publication.

4. Tar oxidation using olivine-nickel catalysts: My team evaluated olivine-nickel catalysts for treating model tar compounds using ozone as an oxidant. Our results indicated exceptionally high activity for complete oxidation of toluene. These results are expected to advance tar clean up processes.

Research Team: Praveen Kolar (NCSU BAE), Mike Boyette (NCSU BAE), Mari Chinn (NCSU BAE), Charles Smith (NCSU Statistics), Guigen Zhang (Clemson University Bioengineering), Rajan Gangadharan (Graduate Student, Clemson University Bioengineering), and Veronica Mbaneme-Smith (Graduate Student).

Status: Completed.

Deliverables: 1) Master's thesis[**] (Ms. Veronica Mbaneme), (2) Two referred publications, and (3) National Science Foundation Graduate Fellowship (Ms. Veronica Mbaneme).

[**] Co-advised by Dr. Mike Boyette, NCSUBAE

5. Aromatization of *n*-octane over Pd/C catalysts: In collaboration with Dr. Bill Roberts (NCSUMAE), I have investigated the role of Palladium impregnated activated carbon (Pd/C) catalyst for dehydrocyclization of straight chain alkanes. Our results indicated that Pd/C catalyst can convert n-hexane into benzene, ethylbenzene and xylenes that may be used in jet fuel.

Research Team: Praveen Kolar (NCSU BAE), William Roberts (NCSU Mechanical and Aerospace Engineering), Andrew Campos (currently at Southern Research Institute), and Mengchen Yin (Graduate Student).

Status: Completed

Deliverables: 1) Master's thesis[$] (Mr. Mengche Yin), and (2) One referred publication.

[$]Co-advised by Dr. Bill Roberts, NCSU MAE

6. Synthesis of low-cost adsorbents from agricultural wastes: Current techniques to prepare activated carbon involve high temperature. Hence, I have investigated a K_2CO_3-assisted low-temperature pyrolysis to produce activated char for mitigation of *p*-cresol (an odorous pollutant emitted from swine lagoons).

Research Team: Praveen Kolar (NCSU BAE), John Classen (NCSU BAE), Jason Osborne (NCSU Statistics), Lalitendu Das (Graduate Student), and Yiying Zhu (Graduate Student).

Status: On-going

Deliverables: 1) Master's thesis (Mr. Lalitendu. Das) (2) two referred publications, and (3) PhD dissertation in progress (Ms. Yiying Zhu)

7. High-value chemicals from switchgrass lignin using activated carbon catalysts: Current biomass to energy practices focus mainly on celluloses and hemicelluloses as feedstock and discard lignin. Considering the unique structure and chemistry of lignin, there is a great potential for catalytically converting lignin into fine chemicals such as phenols, aldehydes, and alcohols**.** In this project, research is currently underway into synthesizing and evaluating novel catalysts for conversion of lignin into aromatic chemicals.

Research Team: Praveen Kolar (NCSU BAE), John Classen (NCSU BAE), Jason Osborne (NCSU Statistics), Ratna Sharma-Shivappa (NCSU BAE), and Lalitendu Das (Graduate Student).

Status: On-going

Deliverables: (1) One referred publication and (2) PhD dissertation in progress (Mr. Lalitendu Das).

8. Pretreatment of switchgrass using Niobium Oxide catalysts: My team is evaluating Niobium Oxide as a solid acid catalyst for pretreatment of switchgrass. Our preliminary results have indicated comparable activity with sulfuric acid pretreatment. Our results are expected to minimize downstream pollution and make the bioethanol processes more competitive.

Research Team: Praveen Kolar (NCSU BAE), Ratna Sharma-Shivappa (NCSU BAE), Jay Cheng (NCSU BAE), and Yane Ansanay (Graduate Student).

Status: Phase I completed and Phase II under way.

Deliverables: 1) Master's thesis (Ms. Yane Ansanay), (2) one referred publication *in review*, (3) PhD dissertation in progress and (4) one invention disclosure to NCSU office of technology transfer.

9. Partial catalytic oxidation of methane into value-added chemicals: In this project, I am exploring selective oxidation catalysts synthesized from waste eggshells for converting methane into platform chemicals such as chloromethane, 1,3 butadiene, benzene, and 2 propenal..

Research Team: Praveen Kolar (NCSU BAE), Sanjay Shah (NCSU BAE), Gary Gilleskie (NCSU Biomanufacturing Training and Education Center (BTEC)), and Gourishankar Karoshi (Graduate Student).

Status: On-going

Deliverables: 1) Master's thesis in progress (Mr. Gourish Karoshi) and (2) one referred publication (*to be submitted*), and (3) invention disclosure.

10. Valorization of swine manure into fuel and char: I am evaluating techno-economical feasibility of converting swine manure into fuel gas and adsorbents capable of selectively mitigating odors from swine lagoons.

Research Team: Praveen Kolar (NCSU BAE), John Classen (NCSU BAE), Mike Boyette (NCSU BAE), and Sterling Fitzgerald (Graduate Student).

Status: On-going

Deliverables: 1) Master's thesis* (Mr. Sterling Fitzgerald) and (2) one referred publication (*in preparation)*

*Co-advised by Dr. John Classen NCSUBAE

11. Adsorption of odors and heavy metals on oyster shell and char: In collaboration with Dr. Sanjay Shah, I am investigating the removal of nickel, copper, and *p*-cresol from swine lagoon water via adsorption on char and oyster shells. If successful, our research will significantly reduce the odors from swine facilities and decrease heavy metal accumulation.

Research Team: Praveen Kolar (NCSU BAE), Sanjay Shah (NCSU BAE), and Zachery Lentz (Undergraduate Student).

Status: On-going

11. GRADUATE ADVISING

11.1 DOCTORAL DISSERTATIONS IN PROGRESS

1. Lalitendu Das (2012-2015): Selective oxidation of lignin into aromatic chemicals.

2. Yiying Zhu (2012-2015): Synthesis of bi-functional activated carbon for simultaneous adsorption of ammonia and VOCs.

3. Yane Ansanay (2013-2015): Niobium oxide pretreatment of switchgrass for fermentable sugar production.

11.2 DOCTORAL DISSERTATION COMMITTEES

1. Sneha Athalye (2008-2012): Production of Biodiesel from Cottonseed oil using *Rhizopus oryzae* whole cell biocatalysts.

2. Anushadevi Paneerselvam (2010-2013): Ozonolysis: a novel oxidative pretreatment technology for energy canes.

3. Jorge Gontupil (2010-2013): Anaerobic co-digestion of swine manure with corn stover for methane production.

4. Rachel Slivka (2009-2013): Synthesis gas fermentation with *Clostridia* bacteria.

5. Woochul Jung (2011-2014): Effect of lignin monomer content on fermentable sugar production from switchgrass and miscanthus.

11.3 MASTERS' THESES DIRECTED/CO-DIRECTED

1. Rick Jones (2008-2010): Removal of fine particulates and dissolved organic compounds in a commercial recirculating aquaculture farm (with Dr. Tom Losordo).

2. Veronica Mbaneme (2009-2011): Catalytic tar reformation of biomass derived synthesis gas (with Dr. Mike Boyette).

3. Sugina Jairam (2009-2011): Oyster shells as a stable solid base catalyst for biodiesel production.

4. Mengchen Yin (2010-2011): Aromatization of n-hexane using Pd/C catalysts (with Dr. Bill Roberts).

5. Yane Ansanay (2010-2012): Pretreatment of switchgrass using niobium oxide catalysts for sugar production.

6. Lalitendu Das (2010-2012): Synthesis of low-cost adsorbents for mitigation of *p*-cresol.

11.4 MASTERS' THESES IN PROGRESS

7. Gourishankar Karoshi (2011-2013). Exploring novel catalysts for selective oxidation of methane into value-added chemicals.

8. Sterling Fitzgerald (2011-2013): Valorization of swine manure for production of syngas and biochar (with Dr. John Classen).

11.5 MASTER THESIS COMMITTEES

1. Matt Hood (2009-2011): Design and operation of a biofilter for treatment of swine House pit ventilation exhaust.

2. Ximing Zhang (2010-2012): Pretreatment of corn stover for sugar production by using the combination of alkaline reagents and switchgrass-derived black liquor.

3. Pankaj Pandey (2011-2012): Combined alkaline (NaOH +Lime) pretreatment of wheat straw for fermentable sugar production.

4. Zhimin Liu (2011-2013): Anaerobic co-digestion of swine manure with agricultural residues for biogas production.

5. Darwin (2011-2013): Potential for methane production from agricultural residues.

12. RESEARCH GRANTS

1. J. J. Classen, J. M Rice, **P. Kolar**, K. D. Zering, C. M. Williams, M. Vanotti, and A. Azogi. Ammonia recovery from swine urine liquid with selective membrane technology (2012-15). US Dept. of Agriculture. $293,151. Role: Co-Principal Investigator.

2. **P. Kolar,** and S. B. Shah. Removal of Volatile Organic Compounds from Swine Facilities via Adsorption: Technical and Economical Evaluation (2012-13). National Pork Board. $31,258. Role: Principal Investigator.

3. **P. Kolar,** and R. Sharma-Shivappa. Catalytic Oxidation of Lignin Into Value-Added Aromatics - CBERD Core Project (2012-13). Center for Bioenergy Research and Development, NSF-Industry/University Cooperative Research Centers. $57,000. Role: Principal Investigator.

4. J. J. Classen, **P. Kolar**, M. Rice, O. Simmons, S. Liehr, K. Zering, and E. Van Heugten. Manure Belt Collection System and Energy Recovery System (2010-13). US Dept. of Agriculture. $659,655. Role: Role: Co-Principal Investigator.

5. J. J. Classen, **P. Kolar**, and S.A. Hale. Modeling airflow in the brooks gasification process (2012-12). Farm Pilot Project Coordination, Inc (Prime--US Dept. of Agriculture (USDA)). $38,493. Role: Co-Principal Investigator.

6. **P. Kolar**. Value added chemicals from switchgrass lignin. 2011-12. NCSU Faculty Research & Professional Development Fund. $3,900. Role: Principal Investigator.

7. R. Sharma-Shivappa, **P. Kolar**, T. Ranney, and S.Peretti. Development of novel oxidative pretreatment technologies for lignocellulosic ethanol production. (2010-2012). Center for Bioenergy Research and Development, NSF-Industry/University Cooperative Research Centers. $54,750. Role: Role: Co-Principal Investigator.

8. W.L. Roberts, and **P. Kolar.** Small scale fuel production from algal feedstocks (2010-11). Diversified Energy Corporation (Prime--US Dept. of Energy (DOE)). $286,000. Role: Co-Principal Investigator.

9. S. B. Shah, and **P. Kolar**. Air quality, gas emissions, and manure improvement through the use and application of Manure Max (2010-11). JDMV Holdings, LLC. $20,663. Role: Co-Principal Investigator.

10. **P. Kolar**. Mitigation of odors from swine housing using catalytic ozonation (2009-10). NCSU Faculty Research & Professional Development Fund. $4,000. Role: Principal Investigator.

13. MEDIA COVERAGE RELATED TO RESEARCH

(Local) NC State News Services: "This Idea Doesn't Stink: New Tech Cuts Industrial Odors, Pollutants." Dated: Release Date: August 26, 2009.

(Regional) Triangle Business Journal: "NCSU's Kolar seeks to zap odor from swine rendering plants." Dated: September 7, 2009.

(National) Science Daily: "New Technology Cuts Industrial Odors, Pollutants." Dated: August 27, 2009.

(National/International) Resource: "New Technology Cuts Industrial Odors, Pollutants." Dated: October/November 2009.

(International) One India News: "Foul odour from industrial chicken rendering facilities may soon be history." Dated: August 27, 2009.

(International) Ecologia: "Inventato metodo per eliminare gli odori industriali senza inquinare e con risparmio energetic."Dated: August 28, 2009.

14. TEACHING INTEREST AND SPECIALIZATION

BAE 422-Introduction to Food Processing Engineering-3 credit hours (Revised by Kolar): Coverage includes the design and analysis of handling systems for discrete and continuous flow material handling systems, the selection and specification of automatic controls, food preservation principles and considerations relevant to the design of food handling systems, and the principles and practices of drying and storing grain.

Level: Undergraduate (Senior/ Rising Junior)

BAE 590- Engineering Principles of Catalytic Processes-3 credit hours (New course developed by Kolar): This course introduces the students to the fundamentals of heterogeneous catalysis and their applications in agricultural and biological engineering. The course covers adsorption, heterogeneous catalysis, rate equations, external and internal transport processes in heterogeneous reactions. Examples of heterogeneous catalysis drawn from agricultural operations such as bioprocessing, gaseous and liquid waste treatment, biomass processing and conversion are discussed.
Level: Undergraduate (Graduate)

15. UNDERGRADUATE ADVISING

1. Casey Bartholomew
2. Donovan Beadle
3. Matt Byrum
4. Clay Campbell
5. Jonathan Collins
6. Kurt Edwards
7. Matthew Westmoreland
8. Hector Rosa
9. Katy Mazer
10. Kristine Huynh
11. Lauren Kingston
12. Conner Smith
13. Joseph Tuney
14. Reina Lemus
15. Justin Weeks,
16. Leanna Shiver
17. Joseph Boyle
18. Charles McKinney III
19. Matt Pace
20. Brandon Miller
21. Andrew Musselman

16. CAPSTONE DESIGN ADVISING

- 2011-2012: Novel Swine Barn Exhaust Air Treatment (with Dr. Sanjay Shah). Team: Asante Cureton, H. Hoggard, K. Njoroge, S. Lahmira, and S. Stone.

- 2009-2010: Mobile Automated Biofilter For Mitigating Air Pollutants. Team: Amy Byrd, J. Blake, R. Shull, E. Godfrey.

17. AWARDS WON BY ADVISEES

- James Bagwell Scholarship (Katy Mazer), 2012.
- National Science Foundation Graduate Fellowship (Veronica Mbaneme), 2011.
- AWMA North Carolina Chapter (Veronica Mbaneme), 2010.

18. PROFESSIONAL AFFILIATIONS

- Institute of Biological Engineering (2004-Present)
- American Society of Agricultural and Biological Engineering (2006-2010, and 2013)
- Sigma Xi (2007)

19. PROFESSIONAL SERVICE AND LEADERSHIP

- **Technical reviewer (Refereed Journals)**
    - Applied Engineering in Agriculture
    - Chemical Engineering Journal
    - Environmental Engineering Science

- Environmental Science and Technology,
- Fuel
- Industrial Crops and Products
- International Journal of Agricultural and Biological Engineering
- Journal of Hazardous Materials
- Journal of Physical Organic Chemistry
- Transactions of ASABE.

- **Technical reviewer (Funding Agencies)**

  - National Science Foundation-Chemical, Bioengineering, Environmental, and Transport Systems (2009, 2010)

  - National Science Foundation Small Business Innovation Research (2010 and 2011)

- **Leadership**

  - Graduate Councilor, Institute of Biological Engineering (2005).

  - Councilor at large, Institute of Biological Engineering (2011).

  - Co-organizer and co-chair for the Institute of Biological Engineering bioethics session (2006-2011).

  - Organizer and chair for the Institute of Biological Engineering bioethics session (2012-Present).

20. PROFESSIONAL DEVELOPMENT

1. New faculty orientation workshop, NCSU Colleges of Engineering and Physical and Mathematical Sciences, Raleigh, NC August 7-8 and 11-12, 2008.

2. Working with funding agencies and developing good funder relationships by Dr. Ruben Carbonell, NCSU, Raleigh, NC, and November 12, 2008.

3. USDA customer/partner dialogue workshop. Florence, SC, November 19, 2008.

4. Aquaculture recirculation technology workshop. December 2008. The NCSU Fish Barn, Raleigh, NC, December 5-6, 2008.

5. Faculty professional development teaching workshop. NCSU College of Agriculture and Life Sciences. Raleigh, NC, May 12-13, 2009.

6. USDA/ARS- NCSU Grants Workshop, Raleigh, NC, March 19, 2010.

7. So you want to win a career award by Dr. Richard Felder, NCSU, Raleigh, NC, April 6, 2010.

8. Ways of understanding teaching: targeting your teaching to maximize student learning. Faculty Workshop by Dr. Joyce Weinsheimer. NCSU Office of Faculty development, Raleigh, NC, April 21, 2010.