



## Andrea Vacca

Ph.D. University of Florence (Italy) - 2005

### Associate Professor

Agricultural and Biological Engineering  
Purdue University  
West Lafayette, IN 47907-2093  
Phone: (765) 447-1609  
avacca@purdue.edu

### Research Areas:

Fluid power

### Classes Taught:

ABE 435 – Hydraulic Control Systems  
ABE 210 – Thermodynamic Principles of Engineering and Biological Systems  
ME 309 – Fluid Mechanics  
ME 467 – Hydraulic Vehicle Design

### Selected Publications (last 5 years):

- Opperwall T.J., Vacca A., 2014, Modeling Noise Sources and Propagation in Displacement Machines and Hydraulic Lines, Transactions of the Japan Fluid Power System Society (in review)
- Altare, G., Vacca, A., 2014, A Design Solution for Efficient and Compact Electro-Hydraulic Actuators, Elsevier Proceedia (in review)
- Cristofori D., Vacca A., 2015, Modeling hydraulic actuator mechanical dynamics from pressure measured at control valve ports, Journal of Systems and Control Engineering (accepted, in press)
- Tang Q., Chen J., Vacca A., 2014, Tribological Behaviors of Carbon Fiber Reinforced PEEK Sliding on Ion Nitrided 2Cr13 Steel Lubricated with Tap Water, Tribology Transaction, (accepted, in press)
- Thiagarajan D., Dhar S., Vacca A., 2015, A Novel Fluid Structure Interaction-EHD Model and Optimization Procedure for an Asymmetrical Axially Balanced External Gear Machine, Tribology Transactions, vol. 58, issue 2, 2015
- Dhar S., Vacca A., 2015, A Novel FSI-Thermal Coupled TEHD Model and Experimental Validation through Indirect Film Thickness Measurements for the Lubricating Interface in External Gear Machines, Tribology International, vol. 82 Part A, February 2015, pp. 162-175
- Devendran R.S., Vacca A., 2014, A Novel Design Concept for Variable Delivery Flow External Gear Pumps and Motors, International Journal of Fluid Power, Vol. 15, Issue 3, 2014, pp.121-137
- Agarwal, P., Vacca, A., Wang, K., Kim, K., Kim, T., 2014, An Analysis of Lubricating Gap Flow in Radial Piston Machines, SAE International Journal of Commercial Vehicles, 7(2): 524-534
- Zhou J., Vacca A., Casoli P., 2014 A Novel Approach for Predicting the Operation of External Gear Pumps Under Cavitating Conditions, Simulation Modelling Practice and Theory (Elsevier), vol. 45, pp 35-49
- Opperwall T., Vacca A., 2014, A combined FEM/BEM model and experimental investigation into the effects of fluid-borne noise sources on the air-borne noise generated by hydraulic pumps and motors, IMechE Proceedings of the Institution of Mechanical Engineers, Part C, Journal of Mechanical Engineering Science February 2014 vol. 228 no. 3 457-471. (IF: 0.633)
- Ritelli G.F., \*Vacca A., 2013, Energy Saving Potentials of a Novel Electro-Hydraulic Method to Reduce Oscillations in Fluid Power Machines: the Case of a Hydraulic Crane, SAE International Journal of Commercial Vehicles, Vol. 6 Issue 2 (October).
- Ritelli G.F., \*Vacca A., 2013, Energetic and Dynamic Impact of Counterbalance Valves in Fluid Power Machines, Energy Conversion and Management (Elsevier) 76 (2013) pp. 701-711. (IF: 2.775)
- Zhou J., Vacca A., Manhartgruber B., 2013, A Novel Approach for the Prediction of Dynamic Features of Air Release and Adsorption in Hydraulic Oils, ASME Journal of Fluid Engineering, Vol. 135(9), Sept 2013 091305 (8 pages). (IF: 0.75)
- Devendran R.S., Vacca A., 2013, Optimal Design of Gear Pumps for Exhaust Gas Aftertreatment Applications, Simulation Modelling Practice and Theory (Elsevier) vol. 38, pp. 1-19. 1st tier (IF: 1.159)
- Dhar S., Vacca A., 2013, A Fluid Structure Interaction-EHD Model of the Lubricating Gaps in External Gear Machines: Formulation and Validation, Tribology International (Elsevier) 62 (2013), pp. 78–90. (IF:1.536)
- Cristofori D., Vacca A., Ariyur K., 2012, A Novel Pressure-Feedback Based Adaptive Control Method to Damp Instabilities in Hydraulic Machines, SAE International Journal of Commercial Vehicles, Vol. 5, Issue 2 (October 2012), pp. 586-596.
- Dhar S., Vacca A., 2012, A Novel CFD- Axial Motion Coupled Model for the Axial Balance of Lateral Bushings in External Gear Machines, Simulation Modelling Practice and Theory (Elsevier), 26 (2012) pp. 60–76. (IF: 1.159)

### Selected Conference Proceedings (last 5 years):

- Opperwall T., Vacca A., 2014, Modeling Noise Sources and Propagation in Displacement Machines and Hydraulic Lines, Transactions of the International Symposium on Fluid Power, Oct. 28-31, 2013, Shimane, Japan
- Altare G., Vacca A., 2014, A Design Solution for Efficient and Compact Electro-Hydraulic Actuators, 2nd Int. Conference on Dynamics and Vibroacoustics of Machines, Sept. 15-17 2014, Samara, Russian Federation.
- Thiagarajan, D., Vacca, A., 2014, A Numerical Procedure to Design the Optimal Axial Balance of Pressure Compensated Gear Machines, 8th FPNI Ph.D. Symposium on Fluid Power, June 11-13, Lappenranta, Finland.
- Ritelli G.F., Vacca A., 2014, A general auto-tuning method for active vibration damping of mobile hydraulic machines, 8th FPNI Ph.D Symposium on Fluid Power, 11-13 June 2014, Lappenranta, Finland.