

1. **Research Title:** Electric Capacitance Tomography Development for Two Phase Flow
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Electrical or Mechanical Engineering/Computational Physics and Numerical Analysis (MS or Ph.D. level)
4. **Objectives:** To develop improved electric capacitance tomography sensors and inversion techniques to characterize two phase liquid/vapor flows.
5. **Description:** Electric capacitance tomography can be used to determine the void fraction, liquid/vapor interfacial area and the velocities of the components in two phase flow. Research is needed to develop better 2D and 3D sensors and data analysis techniques to characterize pressure drop and heat transfer coefficients in these flows. Goals would include:
 - a. Sensors to characterize mini-channel cold plates
 - b. Sensors that would give true area vs volume averages of the void fraction
 - c. Methods to statistically interpret the output of the sensors to better predict instabilities
 - d. Methods to improve liquid/vapor interface resolution
 - e. Methods to increase the frame rate
 - f. Development of finite element models of sensor designs and improved inversion techniques.
 - g. Exploration of electric resistance tomography.

Both experimental and theoretical work are being explored.

6. **Research Classification/Restrictions:** Unclassified
7. **Eligible Research Institutions:**

DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)

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