

# OFFICE OF TECHNOLOGY TRANSFER

# AUBURN UNIVERSITY

## Contact

Brian Wright  
Auburn University  
Office of Technology Transfer  
334-844-4977  
[brian.wright@auburn.edu](mailto:brian.wright@auburn.edu)  
<http://ott.auburn.edu/>  
Reference: Kinetics Chip

## Inventors



*Dr. Jong Wook Hong*  
Assistant Professor  
Materials Engineering



*Dr. Eduardus C. Duin*  
Assistant Professor  
Department of Chemistry and  
Biochemistry

*Sachin Jambovane*  
Graduate Student  
Materials Engineering

[Click here for a listing of Auburn's available life science technologies](#)

[Click here for a listing of Auburn's available physical science technologies](#)



Auburn University is an equal opportunity educational institution/employer

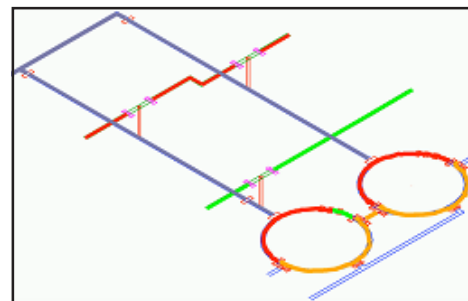
## Protein Kinetics Chip With Automated Parallel Processing

### Overview

This Auburn invention uses a chip-based microfluidics system to rapidly study the behavior of biological enzyme reactions and to permit the manipulation of microliter, nanoliter, and picoliter volumes of fluids. Classical protein kinetics experiments involve manual measurement of samples and reagents, which is a time-consuming and laborious process. The Auburn invention automates and speeds up this process by simultaneously conducting and observing multiple reactions on an integrated microfluidics chip. The chip has applications in laboratory-based biological and medical testing and the evaluation and development of new drugs and reagents.

### Advantages

- **Cost Efficient:** Consumption of high value protein solutions is on the order of pico/nanoliters as opposed to milliliters consumed by conventional experiments
- **Time Efficient:** Traditional systems are slow and manual; this technology completely automates the process and allows for several simultaneous experiments
- **Sensitive Analysis:** Graduated mixing of reagents made possible by the "gradient methodology" metering technique for sensitive analysis
- **Automated Plotting Ability:** Reactions of sample solutions investigated and illustrated by automated two-dimensional plots; processing capabilities include metering, mixing of multiple ratios, analyzing, and reporting



### Description

This protein kinetics chip features a complete automation of microfluidics reaction processes, which enables graduated mixing of reagents for sensitive measurements. It employs parallel processors to perform metering, mixing, analyzing, and reporting. The chip simultaneously initiates and monitors numerous reactions occurring under an adjustable range of conditions. A 30 x 30 mm microfluidics chip for multiple parallel processing of 9 enzyme assays along with one positive and one negative control has been designed and fabricated at Auburn University using a multi-layered input of reagents. This low volume, parallel processing approach allows for faster determination of enzyme kinetic parameters using much less material than conventional experiments. Devices based on such protein kinetics chips could be easily applied to provide a low cost method to rapidly determine important biokinetic parameters in protein folding/unfolding, protein:protein association, and protein:nucleic acid association.

### Status

- A patent application has been filed
- A prototype has been constructed and lab tested
- Related Auburn Technology: [Automated Reaction Kinetic Landscaper](#)

### Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture