



## Inventors

### Dr. Baoxin Li

Associate Professor  
School of Computing and  
Decision Systems  
Engineering

## Intellectual Property

### Status:

Patent Pending

## Contact

### Bill Loux

Director of Business  
Development, Physical  
Sciences

Arizona Technology  
Enterprises, LLC (AzTE)

P: 480.884.1992

F: 480.884.1984

[BLOUX@AZTE.COM](mailto:BLOUX@AZTE.COM)

[TECHNOLOGYVENTURES@AZTE.COM](mailto:TECHNOLOGYVENTURES@AZTE.COM)

## A Video-based System for Improving Surgical Training by Providing Corrective Feedback on a Trainee's Movement

AzTE Case # M13-086P

### Background

Laparoscopic surgery, also called minimally invasive surgery, has become popular for many reasons. These procedures require smaller incisions, which reduces the patient's pain, requires less medication, and allows the patient to heal more quickly than procedures using traditional surgery. Hospital stays are shorter, allowing the patient to return to his daily routine more quickly. As less area is exposed to the open air the patient has a lower chance of infection. Finally, as less cutting is required, fewer blood transfusions are needed because hemorrhaging is reduced.

Traditional surgery requires a different skill set than minimally invasive surgery. The tool at the end of the laparoscopic instrument moves in the opposite direction as the surgeon's hand motion. The surgeon cannot move organs with his hands and must rely on his instruments, so his dexterity is reduced. The procedure is viewed on a monitor, so the surgeon does not have the ability to see the organs in three dimensions. This creates difficulty for the surgeon difficulty when judging the depth of cuts during the operation.

### Invention Description

Researchers at Arizona State University have developed an upgrade to a laparoscopic simulator currently on the market. The innovation includes adding a software package and video equipment to the system that allows the system to capture video of the training work with computer algorithms that can provide feedback. The feedback tells the trainee where his work can improve. The trainee can compare his training sessions to other students and monitor his improvement. The system will maintain a database of expert surgeon's work that the trainee can compare to his own work and see where he needs improvement. He can view his sessions as many times as he wishes on the video monitor.

### Potential Applications

- Training for diagnostic laparoscopy
- Medical schools that train new physicians
- Hospitals to offer continued education

### Benefits and Advantages

- **Lower Costs** – Well-trained laparoscopic surgeons are able to perform out-patient surgeries and eliminate hospital stays.
- **Better Results** – Allows physicians to practice surgical skills in a low-risk environment.
- **Retrofit** – Innovation may adapt to existing equipment currently on the market.