

# Todd Sullivan, Computer Science and Mathematics

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## **TRI: Bridging the gap between wireless sensor networks and autonomous agents**

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Wireless Sensor Networks (WSNs) can offer vast amounts of real-time data about environments. These real-time data streams are an important resource for the ever-increasing number of autonomous agents. Robots can use WSN information to effectively extend their senses and gather data about regions that are not visible or immediately accessible. Additionally, software agents can aggregate WSN data for monitoring purposes such as environmental monitoring and intrusion detection. Despite advances in the field of WSNs, the development of most applications currently requires sensor-specific programming techniques. The research community, as well as industry, needs an efficient, convenient method for accessing WSN data through existing infrastructure such as intranets and the internet. This research project presents TRI, the TinyOS Robot Integration server. TRI is a multithreaded server that provides developers with WSN data management and agent-agent communication channels through a TCP/IP connection and a human-readable message protocol. The TRI server hides the details of retrieving data from and managing a WSN. Thus, developers with standard TCP/IP socket experience can incorporate WSNs into their projects. This research also presents TRI applications executing on a Sony AIBO that responds to its environment by its onboard sensors and the extra sensory data from a WSN.