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**SYSTEMS AND CONTROL SEMINAR
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***Providing Verifiably
Safe Assurance for
Medical Best Practice
Guideline Systems***

**Wed, Sept 26 at 2:15pm
ECE Building, Room 118**

In the United States, preventable medical errors are considered the third leading cause of death and may cost the economy up to \$1 trillion in "lost human potential and contributions" every year. Preventable medical errors are mostly caused by unjustified deviation from applicable medical best practices. The key to reducing preventable medical errors is to assist medical staff to adhere to medical best practice guidelines through executable and verifiably safe medical best practice guideline systems. The talk presents a framework to provide verifiably safe assurance for executable medical best practice guideline systems. The framework contains five major components: (1) formally verify medical guideline statechart models, which are validated by physicians, by transforming them to timed automata, (2) design statechart model patterns to support modeling medical domain important functionalities with statecharts, (3) use runtime monitor to verify safety properties of statechart generated code, (4) model and integrate medical resource demands and availability in medical guideline models, and (5) provide traceback capability to support root causes identification of safety failures. The uniqueness of the framework is that it supports domain experts from different disciplines to participate in the entire development process without requiring the domain experts to have knowledge of other disciplines. The architecture of the framework can be applied to other safety-critical systems in general.



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