PHILOSOPHY · NOT A PRODUCT PITCH

Performance Systems Science

The way I think about modern high performance, and the thread connecting my work across physical therapy, strength and conditioning, sports science, athlete monitoring, and return to performance.

Performance and player availability are not the product of one department. They emerge from how medical, strength and conditioning, sports science, coaching, nutrition, psychology, technology, and the athlete interact over time. Performance Systems Science is the attempt to connect sports science, medical and performance information, workload, athlete context, analytics, staff communication, and workflow into a system that actually improves decisions, rather than simply producing more data.

That's also why my own background doesn't split neatly into one specialty. The hardest problems in performance usually sit between departments, not inside one. I see patterns across departments, but I don't trust my pattern recognition on its own; I build systems that check it. That's what Performance Systems Science is.

A FEW PRINCIPLES THAT HOLD IT TOGETHER

Systems, not components

Sport behaves like a complex adaptive system: a cluster of injuries is rarely one weak link, it's usually a higher-level pressure (fixture congestion, travel, a scheme change) showing up across several athletes at once.

Protect the complex, automate the complicated

ETL, data cleaning, and dashboard maintenance should be engineered away, not done by the people with the clinical and coaching judgment the department actually needs. The goal is more practitioner time on the human part, not more time in spreadsheets.

Closed loops, not open ones

A signal that never ties back to an action, an implementation, and a reassessment isn't a system, it's a report nobody reads. Every piece of monitoring should close that loop. Write down the expected outcome when the call is made, so review can judge whether the call was sound, not only how it turned out.

Decision latency is the real KPI

The gap between knowing and acting, not model accuracy or a dashboard's polish, is what determines whether a system actually changes outcomes. Speed comes from how the department is architected, not from urgency.

Unique profiles, not templates

An athlete's own baseline, not a population average or a generic return-to-play calendar, is what a real decision should be measured against, from daily readiness through return to competition.

AI informs, people decide

Rule first, model second, language model last. Every model is graded in the open, and a named person owns every call.

ONE WORKING PROOF POINT

WAIMS (Women's Athlete Intelligence Monitoring System), a readiness and injury-risk decision-support prototype I built around women's basketball, shows parts of the philosophy working as software rather than as a diagram: personal baselines instead of population thresholds, a closed loop from flag to logged action, and a model that grades its own flags instead of claiming an unverified accuracy number.

Chris Cothern · chriscothern.com · November 2026

This way of thinking draws on people doing real work in this field: Scott McLean, Ian Kadish, David Clancy, William Graham, Zach Higginbotham, and J.P. Wagle, among others, alongside published research such as Bittencourt et al. (2016) on complex systems in sports injury and Stewart et al. (2024) on performance support team effectiveness.