# Project Title

*(Try to choose a catchy title. Max 20 words).*

| CHOC: ATOMAC Guideline-based Algorithm |
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# Team Information

| **Team Name: CHOC**  **Team # on Canvas: 13** | **TEAM CHOC** |
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| **Team member 1 (Team Lead)**  *(Last Name, name; student ID; UCI email; picture):* Yu, Kenny; 20618794; kennetgy@uci.edu |  |
| **Team member 2** Linture, Marcus; 54884520; mlinture@uci.edu |  |
| **Team member 3**  *(Last Name, name: student ID: UCI email, picture):*  Nguyen, Calvin; 7073295797; calvinn7@uci.edu |  |
| **Team member 4**  *(Last Name, name: student ID: UCI email, picture):*  Hu, Kelly; 77102740; kellyh12@uci.edu |  |
| **Team member 5**  *(Last Name, name: student ID: UCI email, picture):*  Leong, Evan; 81124108; leonger@uci.edu |  |

# Project Description

## Motivation/Background

*(Describe the problem you want to solve and why it is important. Max 300 words).*

| There are many children who undergo accidents which lead to organ injuries that may involve their liver, kidneys, or pancreas for example. These organ injuries may often lead to internal or unstable bleeding among the suffering children. Children that suffer from these injuries tend to undergo surgery to halt the bleeding immediately based on guidelines that are referred to as the ATOMAC Pediatric SOI Guidelines to Assess Hemodynamic Stability. Clinical providers can gain a lot of insight and assistance into whether or not a child’s bleeding requires immediate surgery and attention. If a child does not mark enough boxes from the guidelines and does not require surgery, clinical providers and doctors will deem it safe for the internal bleeding to safely go away on its own over time. Therefore, we want to make it possible for these medical providers to simulate these conditions so that they can determine whether or not a child should undergo surgery based on the ATOMAC guidelines. |
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## State of the Art / Current solution

*(Describe how the problem is solved today (if it is), and the innovation/advance of your project. Max 200 words).*

| Currently, there is research to recognize hemodynamic instability in patients using machine learning. A Hemodynamic Stability Index (HSI) was developed to be used for determination of risk for potential hemodynamic interventions. While this research is closely related to our problem, this was aimed for providing better bedside care in the intensive care unit for all hemodynamic instability issues. While that research was for more broad care, our focus in this project is dedicated to a specific injury to childrens’ solid organs. The traditional way of determining hemodynamic stability for these injuries is dependent on the doctors’ expertises and quick judgment, but our project will help give a faster prognosis to make life-saving decisions. |
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# Project Approach

*(Describe how you plan to articulate and design a solution, including platform and technologies to use. Include initial milestones as well. Max 300 words).*

| We started the process by meeting with the Sponsor from the CHOC team and learning more about the project. In this initial meeting/ milestone we went over the resources provided such as algorithms, the dataset, and different biological topics we would be covering. We still need to meet with other members of the CHOC team such as a Doctor to determine the exact technical requirements, which will be the topic of our next meeting. We know that we will need to create a way for medical professionals to run a simulation, change parameters, and view the results to help their decision making. We will be working with the ATOMAC algorithm and a solid organ injury data set from 2020, both of which were provided from CHOC. As said previously our first milestones include meeting with the CHOC team to learn more about the project and then outline technical specifics. Going forward we want to establish a routine of consistent meetings both within our UCI team and additional meetings with the sponsor. After this our next milestone is to start setting up the needed environments to get started working on the project. We want to make sure to thoroughly document the process and keep track of what work is done and when. |
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# Project Outcome / Deliverables

*(Describe what are the outcomes of the project and how you will conduct a short final demo. Max 200 words).*

| Using real patient data such as blood pressure, heart rate, and “cold to touch” assessments, we plan to implement a working machine learning simulation model to successfully determine when patients should be discharged, how critical of a condition they are undergoing is, and if the child requires surgery or not. Our simulation model will be built based on a Lagrangian Neural Network model and using the ATOMAC algorithm. We may look to build a front end interface for easy accessibility of our model if time permits.  After implementation of this model, we will look to create a poster board displaying our findings and implementation in preparation for the ICS Showcase held at the end of Spring quarter. |
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