

# Design Project Proposal Form

## 205: Advanced Mechanical Design

**Project title: Bicycle Frame Connection**

**Required skills, materials, & equipment:**  
**Mechanical Engineering, FEA, Prototyping**

### **Background & motivation:**

Bike riding can provide an enormous benefits in a number of ways from personal health to public transport. The use of a bicycle can be increased dramatically if there is an ability to transport a bike by an alternate means without inconvenience, in a car, bus or backpack for example. One simple means to accomplish this is to fold or disassemble and reassemble an existing bike. Typically this is applied to tandem bikes, but can also be applied to bikes that are single rider. Images below show a few examples of industry standard connectors. These connectors are expensive and are not necessarily optimized for the loading a bike frame may experience.



### **Objective:**

The object of this project would be to create a frame connector that is optimized for loading typically found on a standard bike frame. The connector should work for multiple tube sizes and be less expensive and simpler to use than the current state of the art. Strength, stiffness and in particular fatigue is of critical interest. Extensive simulation and testing will necessarily be part of this project.

### **Deliverables:**

- Benchmarking of current systems with understanding of requirements and specifications
- Multiple design concepts
- Concept selection matrix indicating most promising design alternative
- CAD of proposal, including associated drawing package
- Prototype of design
- Ideally a working, tested breadboard/engineering model

**Team size: 4**