



# Attune: A Lightweight Pre-fitting EMG Training Platform

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The Luminosity Lab

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# Overview



## **Company Name:**

Attune

## **Year Founded:**

2025

## **Founders:**

Ashley Yang

## **Services:**

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## **Team Size:**

-7

## **Design Philosophy**

**Accesible - Non Invasive Design**

**Pre-fitting Early Adaptation**

**User Centered Development**

# Executive Summary

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Amputees transitioning to myoelectric prostheses face a critical yet under-supported phase of prosthetic adaptation: the pre-fitting window. During this period, patients must process limb loss, rebuild physical confidence, and prepare for the cognitive and motor demands of advanced prosthetic control—often without structured training or clear expectation-setting. As a result, many enter prosthetic fitting unprepared for the realities of myoelectric activation, leading to frustration, reduced self-efficacy, prolonged adaptation, and, in some cases, prosthetic abandonment. This early gap in care represents both a clinical vulnerability and a significant opportunity for innovation.

Attune addresses this unmet need through a lightweight, pre-fitting EMG training platform that enables users to experience myoelectric control before receiving their prosthetic device. Using surface EMG signals to drive a virtual hand in a Mixed Reality environment, the gamified system allows patients to practice fundamental open-and-close activation while developing an intuitive understanding of muscle engagement in real time. Attune is not a prosthetic controller or diagnostic device; rather, it is a training and expectation-alignment tool designed to enhance readiness, build early confidence, and provide clinicians with actionable, interpretable insights into patient engagement and control patterns.

By shifting foundational learning into the pre-fitting window, Attune aims to accelerate functional adaptation, improve emotional preparedness, and support smoother transitions to prosthetic use. At scale, this approach has the potential to increase prosthetic adoption and sustained utilization, reduce rehabilitation inefficiencies, and create a more proactive, patient-centered rehabilitation pathway.

The team has developed a functional MVP demonstrating early-stage EMG-driven virtual hand control and is preparing for live demonstrations and pilot engagement with clinical partners. Upcoming milestones include integrating real-time EMG hardware, connecting to a Mixed Reality headsets, refining biologically grounded feedback systems, and conducting small-scale pilot evaluations to assess perceived readiness, clinical utility, and implementation feasibility. Attune is positioned as a scalable B2B2C solution that strengthens clinical workflows while meaningfully improving the amputee rehabilitation experience.

# Background and Problem

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The journey from upper-limb amputation to the successful integration of a myoelectric prosthesis comes with complex physiological, cognitive and emotional challenges. Historically, the clinical pathway has been strictly compartmentalized with patients first undergoing surgery, entering a prolonged healing phase, and then ultimately receiving their prosthetic device. However, this timeline creates a critical, weeks-to-months-long void known as the pre-fitting window. During this period, physical healing is prioritized, but neuromuscular conditioning and psychological preparation are largely neglected. Consequently, amputees are abruptly thrust into the cognitive and physical rigors of myoelectric control upon receiving their device. This presents a jarring transition that reveals a significant vulnerability in the modern neurorehabilitation process.

The pre-fitting window has three primary challenges related to neuromuscular degradation, an expectation-versus-reality gap, and clinical workflow blind spots. First, the absence of targeted motor execution during the prolonged healing phase leads to muscle atrophy, causing amputees to frequently struggle with inconsistent activation when they attempt to command a device. Successful myoelectric prosthetic control relies on the user's ability to generate distinct, voluntary, and sustained surface electromyography (sEMG) signals from residual musculature. Secondly, there are physiological barriers exacerbated by unrealistic amputee expectations which can later cause poor user experience. Amputees often anticipate intuitive, plug-and-play utility, yet the clinical reality of myoelectric control is highly susceptible to real-world confounds including shifts in electrode placement, changes in limb position, and varying contraction intensities due to effort or fatigue that introduce substantial signal noise. And finally, prosthetists and occupational therapists typically approach the initial fitting phase with minimal insight into a patient's baseline neuromuscular capabilities. Without tools to help evaluate where a user can consistently trigger an activation site, maintain a steady signal-to-noise ratio, or sustain a virtual grasp, initial prosthetic tuning defaults to inefficient trial-and-error. Clinicians are forced to use the expensive, heavy prosthetic device itself as the preliminary teaching tool, which extends the fitting process and distracts from advanced functional training.

# Background and Problem

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The culmination of untrained muscle intent, misinformed clinical expectations, and extended trial-and-error fitting protocols directly fuels device abandonment, one of the most persistent issues in upper-limb prosthetics. When the cognitive burden of operating the limb outweighs the functional benefit it provides, patients often reject the technology entirely. This abandonment represents not only a devastating loss of patient independence and confidence but also a massive waste of clinical resources and healthcare expenditure.

Addressing this systemic issue requires shifting the initiation of prosthetic training upstream. There is a pressing need for an accessible, low-burden intervention that operates in the pre-fitting window. By establishing a safe, generalizable environment where patients can practice intent, visualize cause-and-effect relationships, and progressively build signal consistency, rehabilitation providers can fundamentally alter the trajectory of prosthetic limb adaptation. Empowering amputees with an attuned understanding of myoelectric control before they ever don a physical device is the necessary evolution for improving clinical outcomes, optimizing therapist workflows, and ensuring long-term prosthetic utilization.

***ADD A FITTING VISUAL ELEMENT***

# Solution and Services



*Attune introduces a lightweight, pre-fitting EMG training platform.*

*Attune introduces a lightweight EMG pre-fitting prosthetic training platform. The technology uses surface EMG sensors to capture muscle activation signals and directly convert them into the movement of a virtual hand within a customizable Extended Reality environment. Users can practice fundamental activation patterns, through gamified training exercises, and receive immediate visual and (audio?) feedback that reinforces motor learning skills.*

*The system is intentionally crafted as a non clinical training tool prioritizing psychological safety and a simple user experience. Attune focuses on assisting users in understanding the casual relationship between muscle activation and prosthetic movement, supporting both emotional and cognitive readiness. By leveraging motor learning theory and repeated practice, Attune supports schema formation prior to physical device fitting, potentially reducing adaptation time and improving early success rates.*

## Core Offerings

- Pre-fitting XR training sessions
- Gamified motor learning tasks
- Clinical and End-User facing dashboard
- Training protocols and insights

# Team



**Ashley Yang**  
TEAM LEAD AND PRODUCT DEVELOPMENT  
*Junior - Computer Science and Psychology*



**Tanisha Dalwadi**  
SOFTWARE AND UI/UX HCI  
*Graduate Student - Human-Computer Interaction*



**Joshua Perez**  
HARDWARE  
*Sophomore - Electrical Engineering*



**Taylor Foster**  
PRODUCT DEVELOPMENT AND UI/UX/HCI  
*Graduate Student - Human Systems Engineering*



**Barnabas Pasztor**  
BUSINESS DEVELOPMENT AND NEUROPHYSIOLOGY  
*Junior - Biotechnology and Molecular Biosciences*



**Alexander Lumala**  
SOFTWARE  
*Sophomore - Computer Science*



**Nathaniel Teo**  
SOFTWARE  
*Senior - Computer Systems Engineering*

# Competitive landscape and Positioning



*Attune fills the gap between surgery and prosthetic fitting focusing on psychological readiness and early motor learning.*

CATEGORY	WHAT OTHERS FOCUS ON	WHERE ATTUNE DIFFERS
PROSTHETIC MANUFACTURERS	<i>Building better devices and control systems</i>	<i>Prepares patients before device fitting</i>
RESEARCH LABS	<i>Advanced neural control systems</i>	<i>Provides simple and scalable early training</i>
REHABILITATION SERVICES	<i>Therapy after fitting</i>	<i>Supports psychological readiness and starts rehabilitation already prior to fitting</i>
O&P SERVICES	<i>Device fitting and customization</i>	
DIGITAL THERAPEUTICS	<i>Rehab management</i>	<i>Targets prosthetic adaptation specifically</i>
PROSTHETIC STARTUPS	<i>Hardware innovation focusing on physiological adaptation</i>	<i>Focuses on behavioral adaptation</i>

# Future Plans



Current innovations in prosthetics largely focus on physical hardware development and human machine interactions. While the refinement of these technologies contributes significantly to functional rehabilitation, most initiatives primarily address post-fitting rehabilitation, device control, and user experience. This leaves a significant gap in the sector for novel neuro-adaptation technologies.

Attune differentiates itself by focusing on this gap in psychological and motor adaptation during the pre-fitting window. This positions Attune as a complementary tool to existing technologies in the prosthetics and rehabilitation space, rather than as new competitive technology. This strategic position will allow for smooth integration within existing hospital and healthcare networks.

Further development will largely focus on demo rollout, pilot studies, clinical validation, and the refinement of mixed reality clinical dashboards. In the long term, Attune aims to scale as a comprehensive digital training platform embedded within prosthetic rehabilitation workflows all around the world, supporting the proactive model of healthcare that supports psychological readiness and learning.

## Future Plans

- *Clinical Studies*
- *Clinician-facing dashboards and training insights/protocols*
- *Validation within rehabilitation workflows*
- *Scalable digital platform*

## Development/Deployment Roadmap

6 months

Year 1

Year 2



Scan to find out more about Attune (placeholder QR code)

