# Spike-a-Tac: Development Towards a PVDF-based Tactile Finger with Distributed Vibration Sensing

Eric T. Chang §, Peter Ballentine §, Ioannis Kymissis, and Matei Ciocarlie

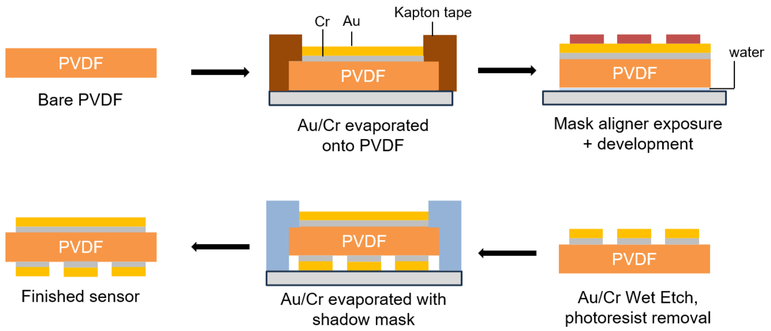
§ equal contribution

Columbia University

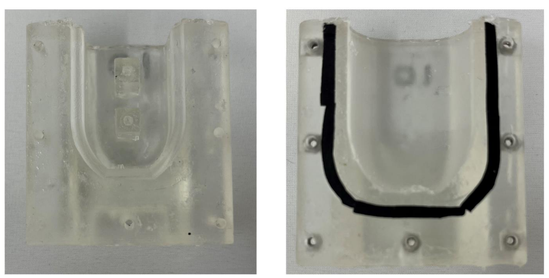
## Overview

- We present a prototype of a tactile finger with distributed vibration sensing using polyvinylidene fluoride (PVDF). We fabricate custom PVDF films with individualized taxels (electrodes).
- PVDF responds only to *changes* in input, and is sensitive to very light touches and vibrations (the response is “spiky,” hence Spike-a-Tac).
- We are working to combine our PVDF films with capacitive sensing as an underlying static force modality. These modalities are complementary, with PVDF targeting vibrations and capacitive sensors measuring constant pressures.

## Taxelized PVDF Film Fabrication

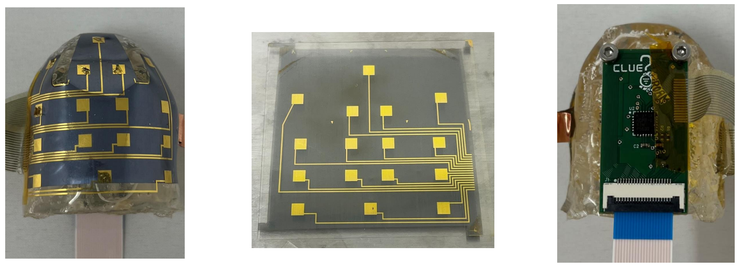



The process flow for fabrication of custom, taxelized PVDF films.

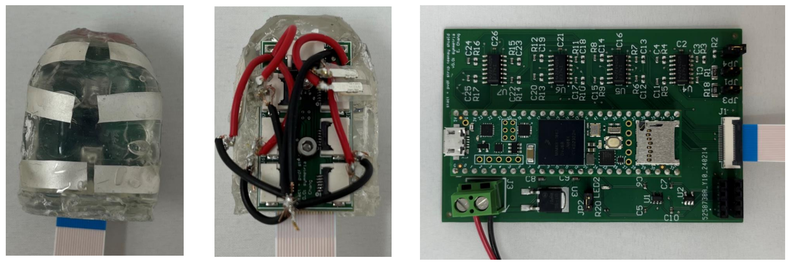


Back (left) and front (right) resin molds used for finger fabrication.

## Prototype

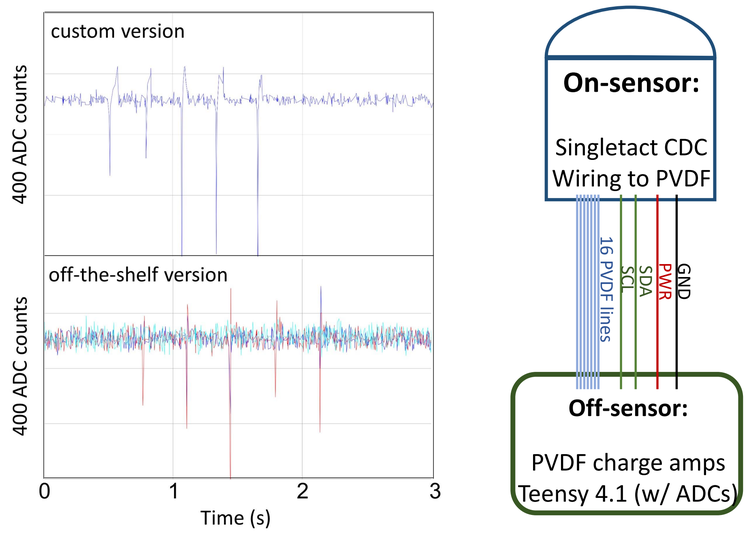


A tactile finger prototype (left) with custom-made, taxelized PVDF film (middle). The sensor interfaces with custom electronics with a heat seal connector (right).

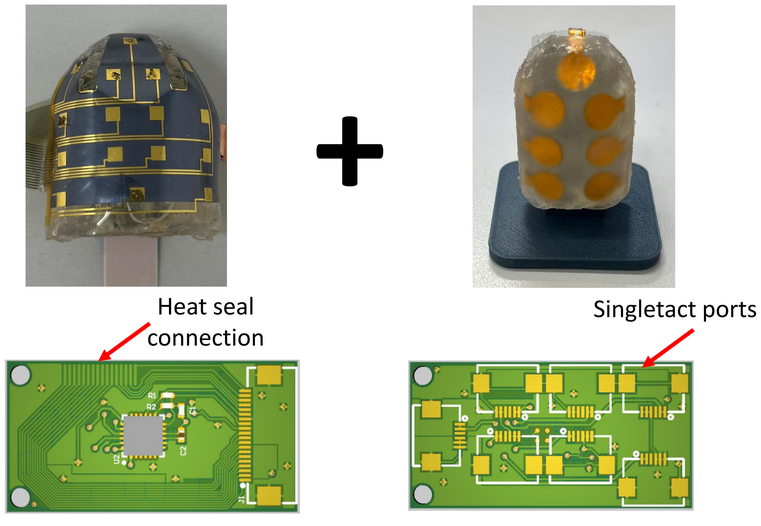


A second prototype version (left) using off-the-shelf PVDF strips from PolyK. Using off-the-shelf strips is easier and faster, but creates wiring challenges (middle). Both versions use an off-finger teensy and amplifiers (right).

## Signal Samples + Electronics




## On-going work: multi-modality




- We are working to combine PVDF with off-the-shelf capacitive sensors into one bimodal finger.
- We are using Singletacts (off-the-shelf capacitive sensors), sampled with the AD7147 CDC.
- These modalities are complementary: PVDF targets detecting initial touch and vibrations, Singletacts target static pressures.
- We hope to explore how these modalities can complement each other for manipulation tasks.

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