My research interests include-

- Contact Geometry and Legendrian Knots.
  - Classification problems.
  - Structure problems.
- Interaction between Contact Geometry and Heegaard Floer Theory.
There are two types of knots in an overtwisted contact manifold—namely loose (with overtwisted complement) and non-loose (with tight complement).

**Theorem (C., 2020)**

*Null-homologous Legendrian links can be completely classified by their classical invariants (up to contactomorphism).*

**Theorem (C., 2020)**

*If $L$ is a null-homologous loose Legendrian link, then the support genus vanishes.*

**Theorem (C., 2020)**

*There are examples of non-loose links with support genus zero.*
How can one classify non-loose knots in overtwisted manifolds?

Few non-loose knot/link types are completely classified in overtwisted $S^3$–

- Non-loose unknots (Eliashberg-Fraser)
- Non-loose torus knots (Etnyre-Min-Mukherjee, in preparation)
- Non-loose Hopf links (Geiges-Onaran)

What can we say about other manifolds?

**Theorem (C-Geiges-Onaran, work in progress)**

*Classification of Hopf links in lens spaces.*
Structure Theorem of knots in overtwisted manifolds

Structure theorem of Legendrian knots $\rightarrow$ behavior of Legendrian knots under topological operations.

**Theorem (C-Etnyre-Min-Mukherjee)**

Suppose $L$ be a non-loose representative of a knot type $K$ in $(M, \xi)$. If $\frac{q}{p} > \text{tb}(L)$ for $q, p > 0$, $L_{p,q}$ is non-loose in $(M, \xi)$.

What about $\frac{q}{p} \leq \text{tb}(L)$?

**Theorem (C-Etnyre-Min-Mukherjee)**

Suppose $L$ be a non-loose representative of a knot type $K$ in $(M, \xi)$ such that $L$ has non-loose transverse push off. Then if $\frac{q}{p} \leq \text{tb}(L)$, then $L_{p,q}$ is non-loose in $(M, \xi)$. 
Legendrian knots and Heegaard Floer theory

- Ozsváth, Szabó and Thurston defined GRID Invariants using combinatorial knot Floer theory.
- Vela-Vick–Wong extended these invariants to the cyclic branched cover and call them “transverse invariant”(2019).
- This transverse invariant in the cyclic branched cover can obstruct decomposable Lagrangian cobordism between Legendrian links in the base space. (C., 2020)