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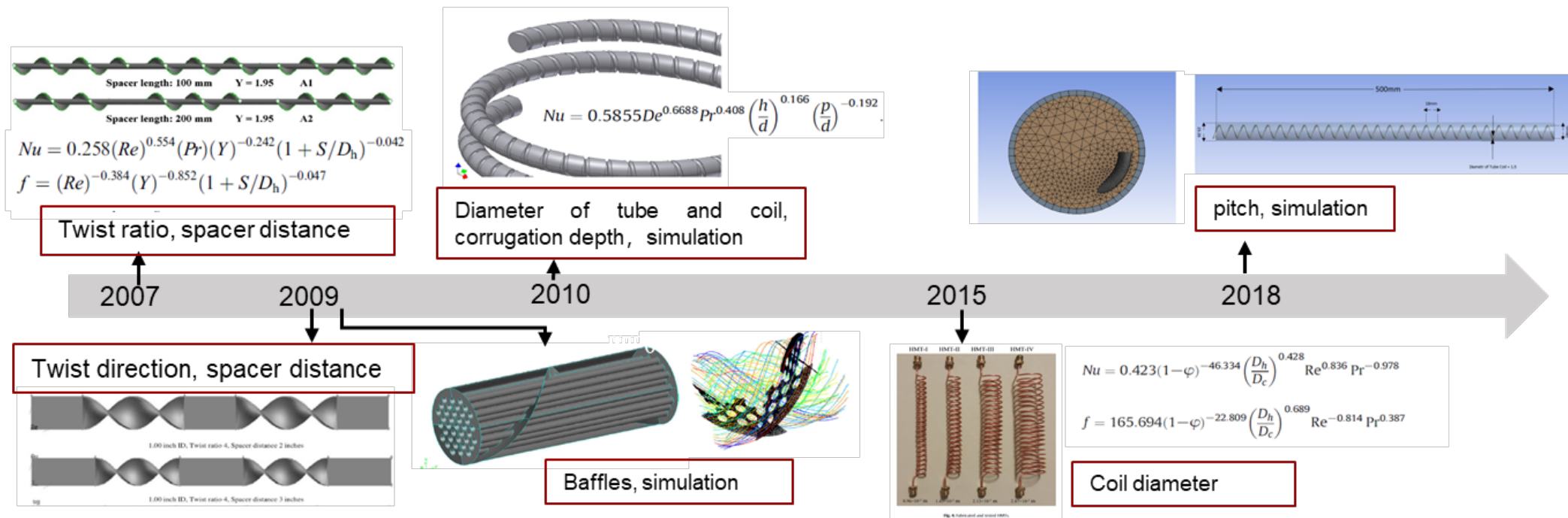
**Simulation and optimization of
helical bundled meso-scale tube heat exchanger**



Background



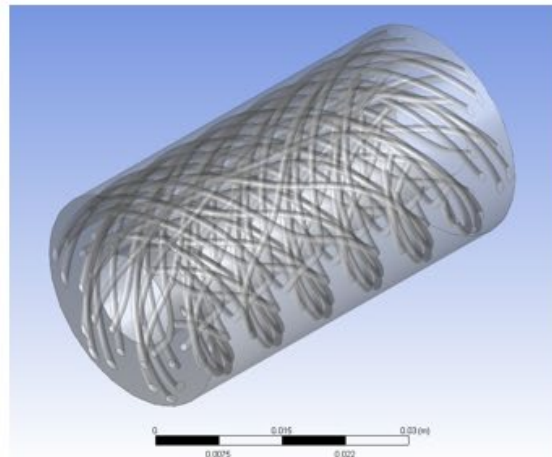
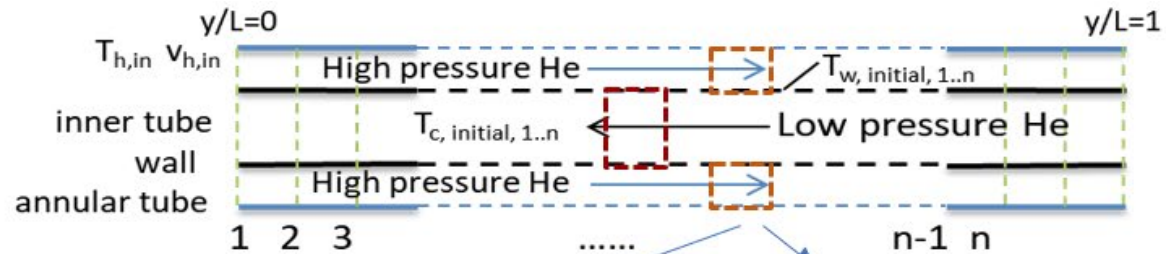
1. Many studies on micro- and meso-scales — **early transition to turbulence** and **thermal enhancement**
2. CFD helps to optimize the design. **Various shapes and geometry factors** are explored, and many correlations are proposed.



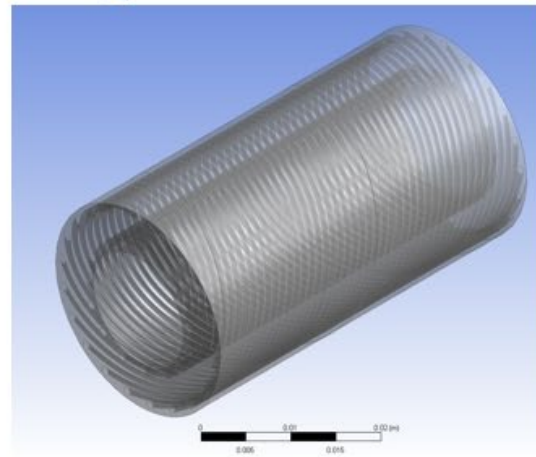
Most enhancements are based on: **Restarting the thermal boundary layer** and **using bulk fluid mixing**



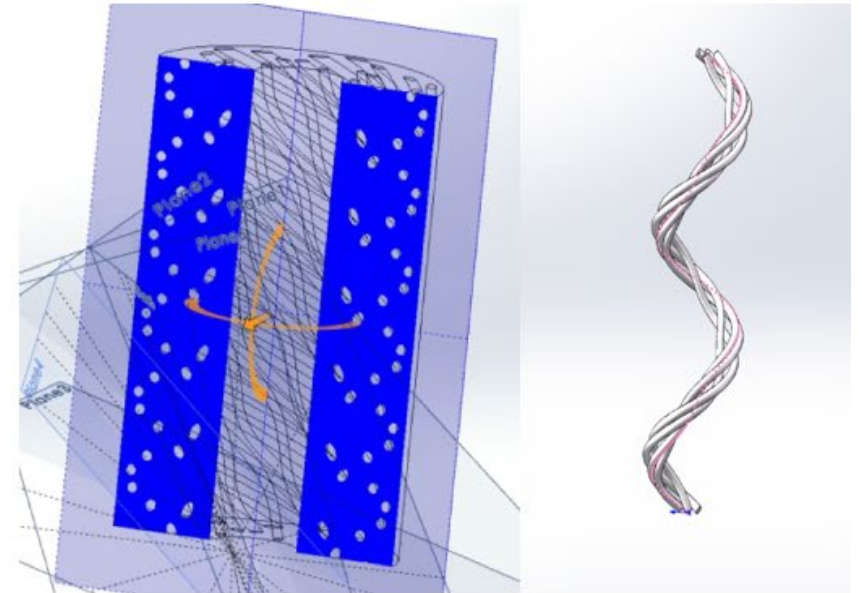
Twisted geometry



Twisted geometry



Spiral geometry



1. The curve is generated by different 3D sinusoidal equations, with the **same end-to-end length and coil diameter**.
2. The cross sections in the twisted geometry varies in the circumferential direction.



Objectives



1. Use Taguchi method to explore the influence of different geometry parameter and optimize the design.
2. Use Fluent simulation to obtain the Nu, friction factor correlation based on Re, Pr and geometry parameter.
3. Build the whole heat exchanger model using MATLAB.