

# Developing a Polyvalent Multifunctional Nanoparticle Strategy to Address Some Biological and Biomedical Challenges

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## Abstract

A great healthcare challenge facing the society today is to find solutions to some of the most devastating diseases, such as cancer, and bacterial and viral infections. This requires rapid and sensitive diagnostic tools as well as effective treatments. In this regard, we are pursuing a polyvalent multifunctional nanoparticle (PMN) strategy to exploit the power of multivalent binding (e.g. greatly enhanced affinity & specificity), surface chemistry, and functional nanoparticles to address this challenge.

In this talk, I will share some of our most recent developments of a glycan-PMN based new platform for probing structural and biophysical mechanisms of multivalent protein-glycan interactions, and for potent blocking Ebola virus infection.<sup>1-4</sup> I will also share our recent work on developing new dual-/multi-ligand functionalised, atomically precise gold nanoclusters for combating bacterial antibiotic resistance,<sup>5</sup> as well as for effective theranostics of cancer lymphatic metastasis.<sup>6</sup>

## References

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- 4) Hooper et al. *ACS Appl. Mater. Interfaces*, 2022, DOI: [10.1021/acsami.2c11111](https://doi.org/10.1021/acsami.2c11111).
- 5) <sup>a)</sup> Pang et al. *Chem. Sci.* 2021, **12**, 14871; <sup>b)</sup> Pang et al. to be published.
- 6) Pang et al. *ACS Nano* 2022, DOI: [10.1021/acsnano.2c03752](https://doi.org/10.1021/acsnano.2c03752).