



## Nonlinear Preconditioning Conjugate Gradient Method for Area-Preserving Parameterizations

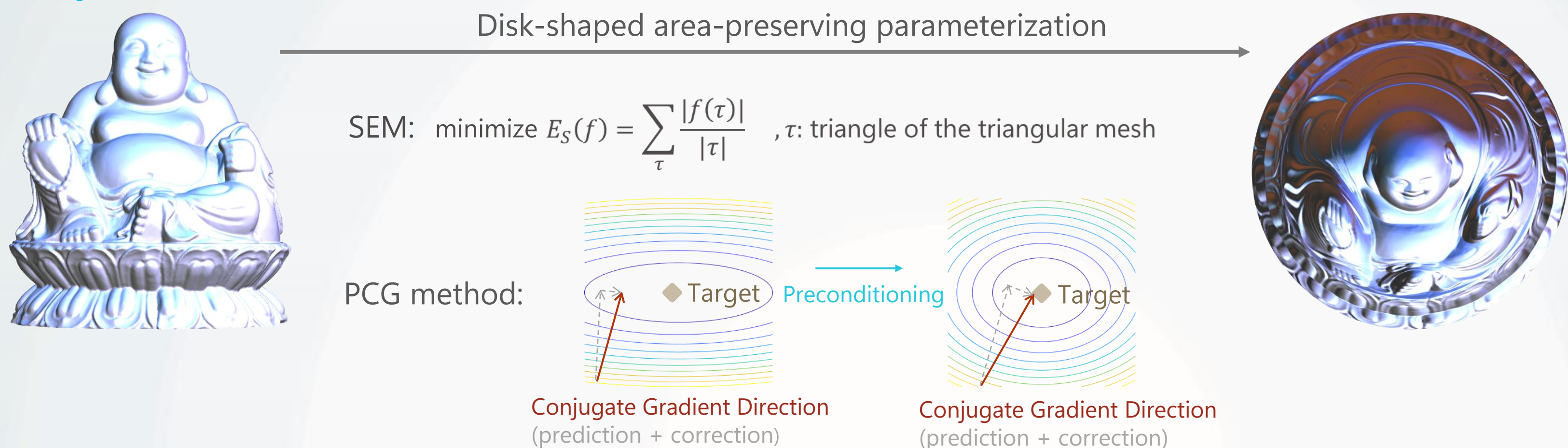
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### Highlights:

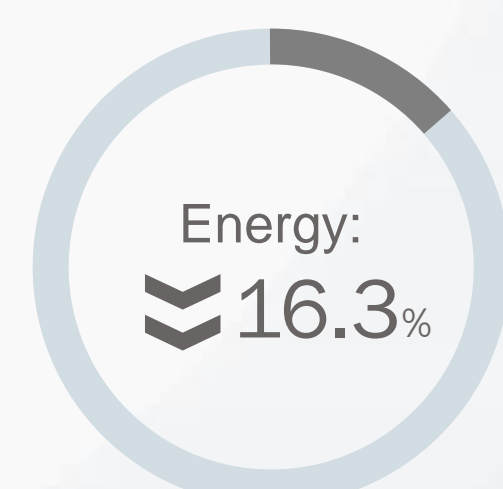
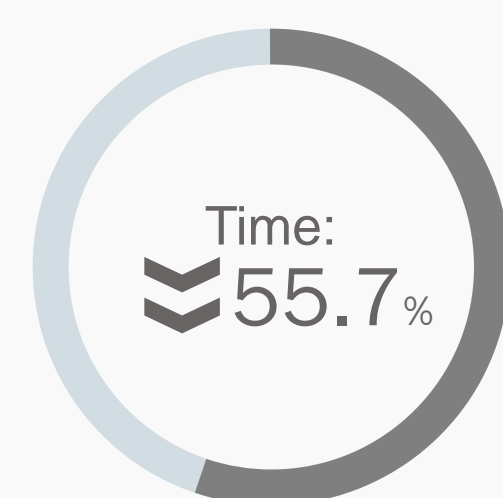
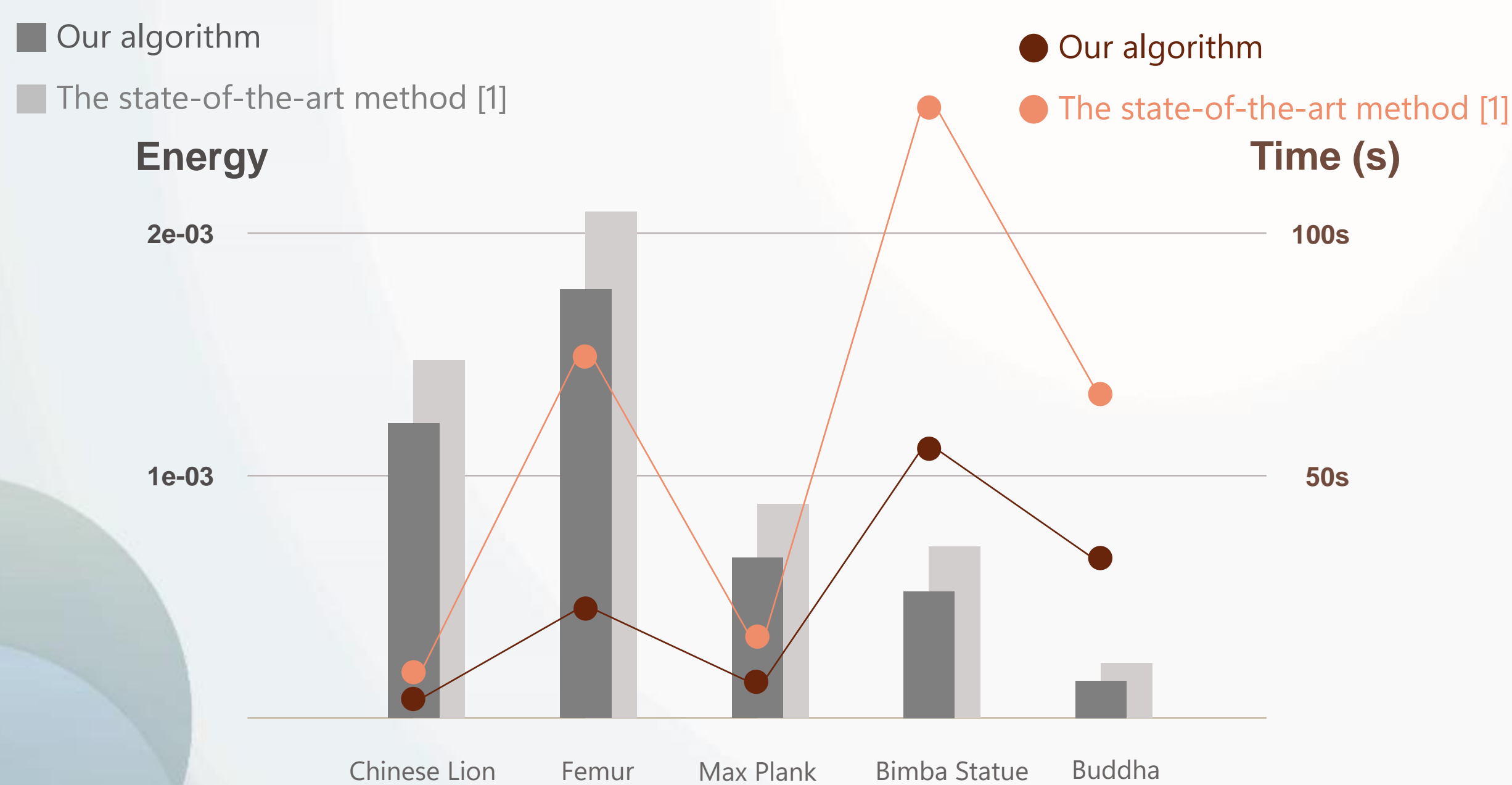
We propose an algorithm for the nonlinear preconditioning conjugate gradient (PCG) method in Stretch Energy Minimization (SEM), which is aimed to obtain area-preserving parameterizations of simply connected open surfaces. Our algorithm has two advantages:

- **Guaranteed convergence** : The convergence of our algorithm is theoretically guaranteed.
- **Improved accuracy and efficiency** : Both accuracy and efficiency of our algorithm are significantly improved compared to other state-of-the-art algorithms.

### Graphical Abstract:



### Numerical Results:



**In summary, our algorithm has the best accuracy and efficiency.**

#### Reference

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- [2] M.-H. Yueh. Theoretical foundation of the stretch energy minimization for area-preserving mappings. *arXiv:2205.14414*, 2022
- [3] J. Nocedal and S. J. Wright. *Numerical Optimization*. Springer, 2e edition, 2006

