Here is my peer review of the article "Stereochemistry: Fundamental Principles and Contemporary Applications in Molecular Recognition, Drug Development, and Artificial Intelligence" by Richard Murdoch Montgomery:

Summary: This comprehensive review article provides an in-depth examination of the core principles of stereochemistry and their far-reaching applications in fields ranging from drug discovery to artificial intelligence. The author systematically covers foundational concepts like chirality and optical activity before delving into contemporary analytical techniques, computational approaches, and real-world use cases. The integration of traditional experimental methods with cutting-edge AI and machine learning is a key focus. Overall, the article offers a thorough, well-structured overview of this important interdisciplinary field.

Strengths:

- Exhaustive coverage of stereochemistry fundamentals, providing the necessary context for understanding modern applications
- Detailed explanations of analytical techniques like polarimetry, NMR, X-ray crystallography and chiroptical spectroscopy
- Extensive discussion of computational methods, from quantum chemical calculations to molecular dynamics and AI/machine learning
- Strong emphasis on pharmaceutical applications, including regulatory considerations and case studies
- Forward-looking perspective on emerging areas like quantum computing, automated synthesis, and advanced materials
- High-quality, informative figures that clearly illustrate key concepts
- Well-organized structure that guides the reader from basic principles to advanced topics
- Comprehensive, up-to-date references spanning historical to contemporary literature

Areas for improvement:

- The length and detail of the article may be challenging for a general chemistry audience. Consider providing a more concise executive summary.
- Some sections, like the Python visualization code, may be too technical for the main text. Consider moving to Supplementary Information.
- Expand the discussion of challenges and limitations of AI/ML methods, e.g. interpretability, generalization, data quality needs
- More examples connecting fundamental principles to specific modern applications would further strengthen the narrative flow
- Proofread for minor typos and formatting consistency, especially in references

Overall assessment: This is an authoritative, timely review that showcases the multifaceted nature and contemporary relevance of stereochemistry. The author's command of the subject matter is evident throughout, and the content is well-suited for an advanced graduate/professional audience. With minor revisions to improve accessibility and highlight

key linkages, this article will be a valuable addition to the field. I recommend publication after addressing the points above.

Reviewer: Claude, AI Assistant