

The 2nd International Conference on Molecular Robot Ethics

Date & Time: 9th Oct. (Tue), 2018 14:00-17:30

Place: Small Conference Room, 5th Floor, Tower-Hall Funabori, Tokyo

Organized by JST HITE projects of Co-creation of Molecular Robot ELSI and Real-time Technology Assessment Research Co-Creation and Communication for Real-Time Technology Assessment (CoRTTA) on Information Technology and Molecular Robotics

Supported by SICE Molecular Robotics Research Group

Molecular Robotics, an emerging interdisciplinary research field among robotics, chemistry and biology has attracted interest from the viewpoint of future technologies potentially applicable to intelligent drug delivery system and artificial muscle for cancer therapy and regenerative medicine, to name a few. This conference focuses on the ethics and technology assessment aspects of molecular robotics. The topics of interest includes comparison between molecular robotics and systems biology ethics, molecular robot guideline, responsible research and innovation and dual use issues in emergence technology, but not restricted to.

Program: Moderator: Ryuma Shineha (Seijo University)

14:00-15:30 <Molecular Robotics, ELSI and TA session>

Opening Remarks

Molecular Robotics: Its Concept, Technology and Ethics

Akihiko Konagaya (Tokyo Institute of Technology)

Safety engineering by synthetic biology

Daisuke Kiga (Waseda University)

Designing RRI after ELSI: To whom are we responsible?

Erika Szymanski (The University of Edinburgh, UK)

15:30-16:00 Break

16:00-17:30 < Interdisciplinary Technology Assessment session>

Japanese Perspectives on Molecular Robotics: Formulating Ethical Principles of Molecular Robotics (ver. 1.1)

Naoto Kawahara (Kyushu University)

On governing risks of emerging technologies: Exemplary cases and cautionary tales from synthetic biology

Kenneth Oye (MIT Political Science, USA)

Interdisciplinary technology assessment – practice and outlook for responsible molecular robotics

Stephan Lingner (EA European Academy of Technology and Innovation Assessment, Germany)

Closing Remarks

Ethical Principles of Molecular Robotics (ver. 1.1)

分子ロボット技術倫理綱領第 1.1 版

(First Edition, 8th August, 2018)
(2018 年 3 月 5 日作成)
(2018 年 8 月 8 日改訂)

Preamble

Nowadays, it is an issue of extreme importance to establish an ethical framework with a new view of material, information and life according to a technological development. With ever-increasing progress in creativity and ingenuity of technology, new devices and systems appear continuously. However, there are concerns about the ethical scope of molecular robotics. In Japan, research and development of molecular robotics has been promoted, taking advantage of an important elemental technology concerning senses, motions and intelligence. More complicated configurations of systems in molecular robotics are conceivable, which will be applied to informatics, engineering, chemistry, biology and medicine in the near future. In this context, we formulate the following ethical principles. We also request any person who engages in molecular robotics to comply with these principles.

今般、技術開発の進展に伴い、新しい物質・情報・生命観を想起し、倫理の枠組みを社会の中に確立させていくことは重要な課題といえよう。モノづくりが進化し、これまでになかったデバイスやシステムが次々と現れる一方、分子ロボット技術の倫理的課題も多岐に及ぶ。わが国の分子ロボット技術は、感覚、運動、知能が重要な要素として捉えられ、それぞれの要素技術を活かした研究開発が進められているところである。将来的に、分子ロボット技術は、より複雑な構成が実現可能になるとともに、情報学、工学、化学、生物学、そして、医学・医療などに応用されることが予想される。このような背景において、私たちは、以下の倫理綱領を定めるとともに、分子ロボット技術に携わるすべての者にその遵守を求めるものである。

Ethical Principles

1. **Comprehensive assessment of risks and benefits**

▶ Any person who engages in molecular robotics shall make a comprehensive assessment of potential harm for human beings or the environment as well as predicted risks and benefits. Then they shall also take measures to minimize those burdens and risks.

リスク・ベネフィットの総合評価

▶ 分子ロボット技術に携わる者は、その技術の複雑化とともに、人間・環境への負担ならびに予測されるリスク及び利益についての総合的な評価を行うとともに、それらの負担及びリスクを最小化させる対策を講じなければならない。

2. **Consideration for safety and environment**

▶ Any person who engages in molecular robotics shall take containment and safety measures for the environment. This includes ethical responsibility and consideration for future generations.

安全と環境への配慮

▶ 分子ロボット技術に携わる者は、環境への拡散防止のための措置、安全の確保に向けた取組を行う必要がある。これは、将来世代に対する責任と配慮を含む。

3. **Paying attention to security and dual-use issues**

▶ Any person who engages in molecular robotics shall investigate security measures in consideration of physical, personnel, transport, material, and information aspects. They shall also pay attention to dual-use issues.

セキュリティとデュアルユース問題への留意

▶ 分子ロボット技術に携わる者は、物理的・人的な観点のみならず、輸送や材料管理、情報の観点も考慮したセキュリティ対応を検討するべきである。併せて、デュアルユースに関する問題にも注意を払う必要がある。

4. **Ensuring accountability and transparency**

▶ Any person who engages in molecular robotics shall ensure accountability and transparency for the public good, making progress of the research and development rooted in social justice.

説明責任と透明性の担保

▶ 分子ロボット技術に携わる者は、社会正義に根ざした研究開発を進展させるにあたり、公共への説明責任と透明性を担保しなければならない。

The above principles will continue to be revised as needed.
以上、この倫理綱領は今後も必要に応じて見直していくものとする。