

2022 SNU-SSWU Joint Topology Workshop

Schedule

시간	08.18.(Thu)	08.19.(Fri)	08.20.(Sat)
07:30~09:00		Breakfast	Breakfast
09:30~10:30		Talk Prof. Seung-Jo Jung	Talk Dr. Hakho Choi
10:30~10:50		Coffee Break	Coffee Break
10:50~11:50		Talk Dr. Ju A Lee	Talk Prof. Jongil Park
12:00~13:30		Lunch	Lunch
14:00~15:00	Welcome & Registration	Talk Dr. Seungwon Kim	
15:00~15:20		Coffee Break	
15:20~16:20	Talk Prof. Ki-Heon Yun	Talk Prof. Yunhyung Cho	
16:20~16:40	Coffee Break	Coffee Break	
16:40~17:40	Talk Prof. Kyungbae Park	Talk 김형기 학생/ 조우혁 학생	
18:00~19:30	Dinner	Dinner	

Venue

[Ramada Hotel & Suites Gangwon Pyeongchang](#)

Seminar Room: Charming I (B2F)

2022.08.18(Thu)~2022.08.20.(Sat)

Participants

1. Prof. Jongil PARK (Seoul National University)
2. Prof. Ki-Heon YUN (Sungshin Women's University)
3. Prof. Kyungbae PARK (Kangwon National University)
4. Prof. Seung-jo JUNG (Jeonbuk National University)
5. Prof. Yunhyung CHO (Sungkyunkwan University)
6. Dr. Hakho CHOI (KIAS)
7. Dr. Ju A LEE (Seoul National University)
8. Dr. Seungwon KIM (QSMS, Seoul National University)
9. 김형기 학생 (Seoul National University)
10. 조우혁 학생 (Seoul National University)



Talk Titles & Abstracts

2022.08.18. (Thursday)

15:20 –16:20

- 발표제목: On the geography problem of Lefschetz fibrations
- 발표자: Prof. Ki-Heon Yun(SSWU)
- 발표내용: Symplectic 4-manifolds are characterized by Lefschetz pencils and fibrations. Lefschetz fibrations are characterized by monodromy factorization and many important invariants are computable from monodromy factorization. It is an interesting question what will be the building blocks of all Lefschetz fibrations and what kind of topological operations are possible in symplectic category and what will be the effect of these

operations in the geography plane. In the talk, we will summarize some old and new approach to the geography problem of Lefschetz fibrations.

16:40 –17:40

- 발표제목: Ozsváth-Szabó 4-manifold invariants and their applications
- 발표자: Prof. Kyungbae Park (Kangwon National University)
- 발표내용: Heegaard Floer theory, introduced by Ozsváth and Szabó early 2000, provides a package of invariants for many objects in low-dimensional topology, such as 3-manifolds, their geometric structures, knots and links in dimension three, and so on. Furthermore, its TQFT(Topological Quantum Field Theory) framework enables us to construct invariants for smooth 4-manifolds, which is able to detect exotic smooth structures. In this talk, we recall the construction of the smooth 4-manifold invariants and introduce some recent applications of them.

2022.08.19.(Friday)

09:30 –10:30

- 발표제목: On hypersurface singularities
- 발표자: Prof. Seung-jo Jung (Jeonbuk National University)
- 발표내용: For a hypersurface $f=0$, there are many invariants of the singularity of $f = 0$, e.g. Milnor number, Tjurina number, multiplicity, loc canonical threshold, minimal exponent, Bernstein-Sato polynomial etc. After basic introduction to the Hodge theory, I introduce these invariants and we discuss the relation between them with some examples.

10:50 –11:50

- 발표제목: On infinitely many torus surgery descriptions of 4-manifolds
- 발표자: Dr. Ju A Lee (Seoul National University)
- 발표내용: As the Dehn surgery along a framed link in S^3 gives a beautiful description for 3-manifolds, one can think of 4-manifolds obtained by the torus surgery along a framed link of tori in S^4 . In this talk, I'd like to introduce several ways to construct a smooth 4-manifold that can be obtained by the torus surgery, with the same surgery coefficient, but along an infinitely many distinct tori in S^4 .

14:00 –15:00

- 발표제목: Surfaces in 4-manifolds
- 발표자: Dr. Seungwon Kim (QSMS, Seoul National University)
- 발표내용: In this talk, I will talk about diagrammatic methods to represent embedded and

immersed surfaces and their applications.

15:20 - 16:20

- 발표제목: Monotone Lagrangians in flag varieties
- 발표자: Prof. Yunhyung Cho (Sungkyunkwan University)
- 발표내용: In this talk, we will construct infinitely many monotone Lagrangian tori in a flag variety not hamiltonian isotopic each other using the cluster structure of a flag variety.

16:40 –17:40

발표 1

- 발표제목: TBA
- 발표자: 김형기학생 (Seoul National University)
- 발표내용:

발표 2

- 발표제목: TBA
- 발표자: 조우혁학생(Seoul National University)
- 발표내용:

2022.08.20.(Saturday)

09:30 –10:30

- 발표제목: Milnor fibers and symplectic fillings of weighted homogeneous surface singularities
- 발표자: Dr. Hakho Choi (KIAS)
- 발표내용: In this talk, we investigate a relation between Milnor fibers and minimal symplectic fillings associated to a weighted homogeneous surfaces singularity. Consequently, we determine a sufficient condition for a minimal symplectic filling of a weighted homogeneous surface singularity satisfying certain conditions to be realized by a Milnor fiber of the singularity.

10:50 –11:50

- 발표제목: Open problems on smooth and symplectic 4-manifolds with small Euler characteristic
- 발표자: Prof. Jongil Park (Seoul National University)
- 발표내용: The geography problem on 4-manifolds with small Euler characteristic has long been studied in algebraic geometry and topology, but it is still mysterious so that there

are many unsolved problems left.

In this talk, I'd like to review some open problems on smooth and symplectic 4-manifolds with small Euler characteristic which might be solved and might not be solved in near future. In particular, we introduce the following research topics:

1. A geography on Lefschetz fibrations with positive signature
2. Smooth/symplectic fake projective planes and the existence of exotic smooth structures on $\mathbb{C}P^2$, $S^2 \times S^2$ and $\mathbb{C}P^2 \# \overline{\mathbb{C}P^2}$.
3. (Algebraic) Montgomery-Yang problem

Sponsor

This workshop is supported by National Research Foundation of Korea (NRF)

