MAT 1344: SUGGESTIONS FOR PROJECTS

(See more sources below.)

(1) **Symplectic toric manifolds**
- Ana Cannas da Silva, "Symplectic toric manifolds", in Birkhäuser 2003 volume

(2) **Cohomology of symplectic quotients**
- Shaun Martin's 2000 eprint "Symplectic quotient by a nonabelian group and by its maximal torus".

(3) **Non-Kähler Hamiltonian torus actions**
- Tolman's 1998 Inventiones paper.

(4) **Flexibility of symplectic structures on open manifolds**
- McDuff-Salamon section 7.3.

(5) **Symplectic capacities**
- McDuff-Salamon section 12

(6) **The Arnold conjecture**
- Conley-Zehnder's 1983 Inventiones paper
- McDuff-Salamon section 11.1, 11.2.

(7) **Gompf gluing**
- McDuff-Salamon section 7.2
- Gompf's 1995 paper "A new construction of symplectic manifolds"

(8) **Contact geometry**
- Hansjorg Geiges's book "An introduction to contact topology"

(9) **Poisson geometry**
- Alan Weinstein's paper "The local structure of Poisson manifolds".

(10) **Euler-like vecor fields**
- Meinrenken's "Euler-like vector fields, normal forms, and isotropic embeddings"

(11) **Morse theory for momentum maps**
- Frankel's 1959 paper "Fixed points and torsion on Kähler manifolds"
- Audin's book "Torus actions ...".

(12) **Symplectic packing constructions**
- Lisa Traynor's 1995 JDG paper.

(13) **Arnold-Liouville theorem**
- Duistermaat "On global action angle coordinates"
- Arnold's book "Mathematical methods of Classical Mechanics"

(14) **"Figure eight solution" to the three-body problem**
- 2000 Annals paper by Chenciner and Montgomery

(15) **Geometric quantization**
- Guillemin-Sternberg, "Geometric quantization and multiplicities of group representations"

(16) Other topics – see sources below; talk to Yael.

Bibliography:

- Alan Weinstein, Lectures on symplectic manifolds, 1977.
- B. Aebischer, M. Borer, M. Kalin, C. Leuenberger "Symplectic geometry, an introduction based on the seminar in Bern, 1992".
- Christoph Hummel, "Gromov's compactness theorem ...", 1997.
- Arnol'd-Novikov (Eds.), "Dynamical systems IV", 1990. (Encyclopaedia of Mathematical Sciences, volume 4, Springer-Verlag.)
- Audin, "Torus actions on symplectic manifolds".
- Audin, Cannas da Silva, and Lerman, "Symplectic geometry of integrable Hamiltonian systems".
- Cannas da Silva, "Lectures on symplectic geometry".
- Hofer-Zehnder, "Symplectic Invariants and Hamiltonian Dynamics".
- McDuff-Salamon, "Introduction to Symplectic Topology", 2nd Edition. (Warning: in the 3rd edition, the sections numbers may have changed.)