**The schedule for the intern (Han’s part):**

1. The research for selective encryption (SE) for bitmaps based on DCT.
   1. Firstly re-implement previous SE method [1] for a bitmap without the key implementation (just focus on the structure and implement on Matlab).
   2. Add a pseudorandom number generator (PRNG) on Matlab to improve this previous work.
   3. Analyze the problems of this SE method including storage space design; recursive loss of information; noise introduced by rounding floating point numbers. For this step, I would expect many figures with solid analysis to illustrate the problems ignored by the author and limitations of SE usage.
   4. Analyze the statistical property of this SE method including PSNR, entropy, randomness, etc and try to manipulate the selection ratio to test the sensitiveness of numbers of coefficients. For this step, I would expect a thorough answer for questions like “how many coefficients selected to protect is enough”.
2. The research for agnostic SE method based on lossless Wavelet.
   1. Firstly try to be familiar with lossless wavelet filter (Le Gall 5/3 [2]) and the SE method described in my thesis.

More knowledge to know: Hash function, wavelet transform.

* 1. Try to test the sensitiveness of selection ratio for wavelet coefficients. For this step, I would expect a thorough answer for questions like “why always protect the low frequency if the data format is NOT image”.

The timeline:

There are about four months for this internship.

In fact, there are about 20 working days per month so totally there are 70-80 working days. And the final report will cost 10-20 working days.

For the DCT related SE research: 1.1 is almost done; 1.2 will need a short time; 1.3 and 1.4 will need about 10-15 working days in total.

For the Wavelet related SE research: 2.1 will cost 5-10 working days; and 2.2 will cost 10-15 days.

There will be around 20 working days for working with Katarzyna.

Considering there is some time flexibility in this schedule, 2.2 can be reduced or extend for a more general answer for all kinds of transformation based SE method.

[1] Krikor, L., Baba, S., Arif, T., & Shaaban, Z. (2009). *Image encryption using DCT and stream cipher*. European Journal of Scientific Research, 32(1), 47-57.

[2] Burrus, C. S., Gopinath, R. A., Guo, H., Odegard, J. E., & Selesnick, I. W. (1998). *Introduction to wavelets and wavelet transforms: a primer* (Vol. 1). New Jersey: Prentice hall.