

**A. Topics for 2-semester UG research project course 2017/18**  
 (BISC) LIFS 4970/4980 (BCB) LIFS 4971/4981 (BIOT) LIFS 4973/4983  
 (IRE track) SCIE4500 / 4981 or 4983

Faculty name	Project code	Research topic	Remarks
Prof. David K BANFIELD bodkb@ust.hk	A001	1: Using biochemical, cell biological and genetic approaches to study protein trafficking	
Prof. Tom Hiu Tung CHEUNG tcheung@ust.hk	A004	1: Molecular regulation of muscle stem cell quiescence	
Prof. King Lau CHOW bokchow@ust.hk	A005	1: Genetics of fan morphogenesis by genetic screen with KC62 or derivatives	
	A006	2: Assembly of an array of assays and markers for ploidy monitoring in animals.	
	A007	3: Establishment of a novel model animal system for genetic study	
	A008	4: In vitro analysis of protein-protein interaction affinity using dominant mutant protein to evaluate the protein complex formation in animal development.	
	A009	5: Construction of chimeric G protein receptors and tuning of the animal communication efficacy by changing receptor repertoire and function.	
	A010	6: Construction of a CRISPR-dCas9 based sensor circuit for DNA species detection.	
	A011	7: Generation of a dominant marker for non-model genetic species to facilitate effective transgenesis and selection.	
Prof. Kenny K CHUNG bckchung@ust.hk	A012	1: Characterization of familial Parkinson's disease linked gene products	
Prof. Yusong GUO guoyusong@ust.hk	A013	1: Molecular mechanisms that regulate post-Golgi trafficking of a neurotrophin receptor, p75	
	A014	2: Purification of vesicles enriched with a planar cell polarity protein, Vangl2	
Prof. Pingbo HUANG bohuangp@ust.hk	A017	1: Molecular mechanisms of TMC1's cell-surface targeting	
	A018	2: Assessment of hearing loss of mutant mouse lines	
	A019	3: Purification and characterization of prestin	
Prof. Nancy Ip Contact via: Prof. Amy Fu boamy@ust.hk	A020	CRISPR/Cas-mediated genome editing in iPSCs	
	A021	Transcriptome profiling of iPSC-derived neural cells	
	A022	Regulation of microglial phenotype in Alzheimer's disease	
Prof. Toyotaka ISHIBASHI toyotaka@ust.hk	A023	1: Investigating nucleosomal dynamics by single-molecule optical tweezers	
	A024	2: Studying the function of epigenetically modified histones	
	A025	3: Elucidating RNA polymerase transcription elongation mechanism and effects of transcription elongation factors	
Prof. Danny Leung dcyleung@ust.hk	A029	1: Epigenetics in melanoma	
	A030	2: Epigenetics in stem cells	
Prof. Ning LI boningl@ust.hk	A031	1: From proteomics to the biological functions	
Prof. Chun LIANG bccliang@ust.hk	A032	1: DNA replication initiation proteins in budding yeast	
	A033	2: DNA replication initiation proteins in human cells	
	A034	3: Lung cancer metastasis mechanisms.	
Prof. Hongbin LIU liuhb@ust.hk	A035	1: Thermal preference of marine Synechococcus strains and their responses to global warming	
	A036	2: Continuous monitoring of phytoplankton community composition in Port Shelter	
	A037	3: Carbon to Nitrogen ratio in different cyanobacteria	
Prof. Kai LIU kailiu@ust.hk	A038	1: Mechanisms of the conditioning lesion effect in dorsal root ganglion neurons	
	A039	2: Non-visual functions of the intrinsically photosensitive melanopsin retinal ganglion cells	

Prof. Ho Yi MAK hym@ust.hk	A040	1: New transgenic strains for monitoring fat storage in <i>C. elegans</i>	
	A041	2: Biochemical purification and application of the Cas9 nuclease for CRISPR	
Prof. Tuan Anh NGUYEN tuananh@ust.hk	A044	1. Purification of IgG protein	
	A045	2. Purification of ligases	
Prof. Hyekeun PARK hkpark@ust.hk	A046	1: Testing whether mutant Huntingtin proteins disrupt the functions of mitochondria in Huntington's disease mouse model by measuring the size and number of mitochondria.	
	A047	2: Examining whether mutant Huntingtin proteins disrupt the functions of synaptic vesicles in Huntington's disease mouse model by measuring the number of synaptic vesicles	
	A048	3: Real-time imaging of single motor proteins.	
Prof. Randy Y C POON rycpoon@ust.hk	A049	1: Knocking out essential genes using CRISPR-Cas9: rescue with an inducible degradation system	
	A050	2: Making polyploid liver cancer cells	
Prof. Robert Zhong QI qirz@ust.hk	A051	1: Characterizing proteins involved in the control of microtubule growth	
	A052	2: Deciphering the molecular mechanisms of mitotic spindle assembly	
Prof. Peiyuan QIAN boqianpy@ust.hk	A053	1: Development of secondary metabolite fingerprinting database of marine bacteria using UPLC-MS and MS-MS.	
Prof. Julia L. SEMMEHACK jsemmelhack@ust.hk	A054	1. Analysis and classification of behaviors in zebrafish larvae	
	A055	2. Mechanisms of eye convergence in zebrafish	
Prof. Wenxiong WANG wwang@ust.hk	A058	1: Heavy metal pollution monitoring in Pearl River Estuary.	<b>BISC only</b>
Prof. Zilong WEN zilong@ust.hk	A059	1: Study of myeloid cell development using zebrafish model system	
Prof. Joseph T Y WONG botin@ust.hk	A060	<p>1: Chromosome integrity mutants in dinoflagellates</p> <p><b>Description:</b> The dinoflagellates not only have genome sizes up to 80-100 times that of human beings (up to 250 vs 3 pg of haploid genome size), they are also devoid of detectable-nucleosomes and their chromosomes are apparently quasi-condensed throughout the cell cycle. The present project aims to isolate and characterize dinoflagellate mutants with different genome sizes. The project will involve cell biological and molecular techniques in the generation and monitoring of dinoflagellate lines. The resulting lines of dinoflagellates will help to delineate the possible loss/gain of genomic DNA on the resulting dino-chromosomes.</p> <p><b>References</b> Fojtová, M., Wong J.T.Y., Dvořáčková, M., Yan, K.T.H., Sýkorová, E. and Fajkus J. (2010). Telomere maintenance in liquid crystalline chromosomes of dinoflagellates. <i>Chromosoma</i>. Mak, C.K.M., Hung, V.K.L., and Wong, J.T.Y. (2005). Type II topoisomerase activities in both the G1 and G2/M phases of the dinoflagellate cell cycle. <i>Chromosoma</i> 114, 420-431. Wong, J.T.Y., and Kwok, A.C.M. (2005). Proliferation of dinoflagellate blooming or bleaching. <i>Bioessays</i> 27, 730-740. Yeung, P.K.K., New, D.C., Leveson, A., Yam, C.H., Poon, R.Y.C., and Wong, J.T.Y. (2000). The Spindle Checkpoint in the Dinoflagellate <i>Cryptothecodinium cohnii</i>. <i>Exp Cell Res</i> 254, 120-129. Moreau H., Géraud M.L., Bhaud Y., Soyer-Gobillard M.O. (1998) Cloning, characterization and chromosomal localization of a repeated sequence in a dinoflagellate : <i>Cryptothecodinium cohnii</i> Biecheler. <i>Internatl. Microbiol.</i> 1:35-43. Dinoflagellates are amazing group of organisms for many other reasons Dinoflagellates are also the primary producer of the coral reef community (as symbiotic zooxanthellae) and major causative agents of red tides and many natural products (e.g. Omega-3, Dinoflagellates are also the sister group to many major human parasites, including <i>Plasmodium</i> ( malaria) and <i>Toxoplasma</i>.(Toxoplasmosis). <a href="http://wordsinmocean.com/2013/01/08/5-reasons-why-dinoflagellates-are-amazing">http://wordsinmocean.com/2013/01/08/5-reasons-why-dinoflagellates-are-amazing</a></p>	<b>(up to 2 students)</b>

		<p><a href="https://www.dsm.com/markets/foodandbeverages/en_US/products/nutritional-lipids/life-dha.html">-friggin-awesome/ https://www.dsm.com/markets/foodandbeverages/en_US/products/nutritional-lipids/life-dha.html</a></p> <p>Seminar projects</p> <ol style="list-style-type: none"> <li>1. Why would dinoflagellates have 5-hydroxymethyluracil ?</li> <li>2. Why would dinoflagellates have such large genomes ?</li> <li>3. What are the dinoflagellate internal cell walls for?</li> <li>4. How come dinoflagellates have so many toxins ?</li> </ol>	
	A061	<p>2:Characterization of dinoflagellates from Hong Kong waters</p> <p><b>Description:</b> Dinoflagellates are not only the major red-tide causative agents, they are important primary producers, essential endosymbionts of coral reefs and also produce many important bioactive compounds(e.g. DHA). With the dinoflagellate species recently isolated from Hong Kong waters, the present project aims to optimize the culture conditions (e.g. varying temperature, pH, salinity) and understand their response (e.g. morphological adaption) to different stress conditions.</p>	<b>1-2 students</b>
Prof. Wan Keung WONG bcwkrw@ust.hk	A062	1: Expression of valuable proteins in Escherichia coli	BISC and BIOT only
	A063	2: Expression of valuable proteins in Bacillus subtilis	
	A064	3: Demystifying the mechanisms for intein-extein cleavages	
Prof. Yung Hou WONG boyung@ust.hk	A065	1: Drug-induced upregulation of metastasis suppressors	
	A066	2: Structure and function of the type 2 melatonin receptor	
Prof. Angela Wu Angelawu@ust.hk	A067	1: Genome-wide chromosomal accessibility study of liver cells	
	A068	2: Discovery of protein-binding DNA particles	
Prof. Zhenguo WU bczgwu@ust.hk	A069	1: Identification of Paxbp1-interacting proteins.	
Prof. Hannah Hong XUE hxue@ust.hk	A070	1: GABAA receptor structure, function and genetics	
	A071	2: The application of bioinformatics	
	A072	3: Human Genome and diseases	
Prof. Yan YAN yany@ust.hk	A073	1: Genetic screening and characterization of genes involved in cell competition and tumor initiation.	
Prof. Qinglu ZENG zeng@ust.hk	A074	1: Isolation and sequencing of cyanobacterial viruses from the South China Sea	
	A075	2: Evolution of cyanobacterial viruses with different host strains	
Prof. Mingjie ZHANG mzhang@ust.hk	A076	1: Biochemical characterizations of gene products related to autisms and schizophrenia.	1 quota and BCB only
Prof. Guang ZHU gzhu@ust.hk	A077	1: DNA replication at telomere	
	A078	2: Structure-function of telomerase	
	A079	3: Structure-function mammalian pre DNA replication complex	
Prof. Jiguang WANG jgwang@ust.hk	<b>A080</b>	<b>1: Machine learning approaches in precision cancer medicine;</b>	<b>Updated: 4 May 2017</b>
	<b>A081</b>	<b>2: Identification of functional long noncoding RNAs in gliomas;</b>	

**B. Topics for 1-semester Capstone course – UG Research project 2016/17**  
(BISC) LIFS4960 (BCB) LIFS 4961 (BIOT) LIFS 4963

Faculty name	Project code	Research topic	Remarks
Prof. Yusong GUO guoyusong@ust.hk	B001	1: Analysis of the interaction between Arfrp1 and the adaptor complex 1	Spring 2018 only
Prof. Toyotaka ISHIBASHI toyotaka@ust.hk	B002	1: The effect of post-translational modified histones in nucleosome stability	Only Fall or Spring
	B003	2: Identifying transcription regulation factors	

**C. Topics for 1-semester Capstone course – UG Literature review 2017/18**  
(BISC) LIFS4960 (BCB) LIFS 4961 (BIOT) LIFS 4963

Faculty name	Project code	Topic for Literature review	Remarks
Prof. David K BANFIELD bodkb@ust.hk	C001	1: Cellular stress response pathways	
	C002	2: The role of the Golgi in cancer development	
	C003	3: New model systems for the study of “next generation” topics in cell and developmental biology	
Prof. Tom Hiu Tung CHEUNG tcheung@ust.hk	C004	1: Epigenetic regulation of somatic stem cells	
	C005	2: Stem cell ageing	
Prof. King Lau CHOW bokchow@ust.hk	C006	1: A. Molecular regulation of symbiosis : cross talk and genetic exchanges.	
	C007	2: Comparison of Daisy Drive and Kill Switch in controlling biased genetic allele from spreading fast in a population.	
	C008	3: Comparison of chemico-, photo-, mechano- and magneto- activated gene switch in control gene expression and its modulation, benefit and limitation	
	C009	4: Assembly of BioArt as an integration of science and artistic presentation, what is the limitation and the uncharted frontier?	
	C010	5: Control of respiration rate, neuro input and modulation.	
Prof. Kenny K CHUNG bckchung@ust.hk	C011	1: Factors that contribute to neurodegenerative disorders	Only Fall or Spring
Prof. Yusong GUO guoyusong@ust.hk	C012	1: Roles of intracellular trafficking in establishing cell polarity	
Prof. Pingbo HUANG bohuangp@ust.hk	C013	1: Role of cAMP signalling in the regulation of hair-cell function in the inner ear	
	C014	2: Molecular mechanism of touch sensation	
	C015	3: Molecular mechanism of sensing food texture	
Prof. Danny Leung dcyleung@ust.hk	C020	1. Epigenetics in transcriptional regulation	
	C021	2. Epigenomics and 3D nuclear organization	
Prof. Chun LIANG bccliang@ust.hk	C022	1: Cancer prevention	
	C023	2: Cancer therapy	
Prof. Hongbin LIU liuhb@ust.hk	C024	1: Data analysis for Hong Kong EPD dataset on coastal water parameters (or other time-series dataset)	
Prof. Kai LIU kailiu@ust.hk	C025	1: Mechanisms of the conditioning lesion effect in dorsal root ganglion neurons	
	C026	2: Non-visual functions of the intrinsically photosensitive melanopsin retinal ganglion cells	
Prof. Ho Yi MAK hym@ust.hk	C027	1. The molecular basis of fatty acid absorption	Only Fall or Spring
	C028	2. Strategies for combating parasitic nematodes	
Prof. Tuan Anh NGUYEN tuananh@ust.hk	C032	1: RNA helicases in miRNA biogenesis and related human diseases	
	C033	2: miRNA in posttranscriptional regulation	
	C034	3: Small RNA in gene regulation	
	C035	4: miRNA clusters and human diseases	
Prof. Hyocheon PARK hkpark@ust.hk	C036	1: Investigating whether mutant Huntingtin proteins affect mobility of organelles.	
Prof. Randy Y C POON	C037	1: Drawing cells: from Leeuwenhoek to CGI	

rycpoon@ust.hk	C038	2: Fermented eggs: a biochemical and comparative cultural overview	
	C039	3: An meta-analysis of the history and prospect of biomedical publications from Hong Kong	
Prof. Robert Zhong QI qirz@ust.hk	C040	1: Molecular insights into the control of human brain size	
	C041	2: Functional genomics of cancer metastasis	
Prof. Peiyuan QIAN boqianpy@ust.hk	C042	1: Quorum sensing molecules and mechanisms of biofilm development	
	C043	2: Environmental impact on symbiosis of corals	
Prof. Julia L. SEMMEHACK jsemmelhack@ust.hk	C044	1: Structure and function of the visual fovea	
	C045	2: Comparative study of binocular vision	
Prof. Wenxiong WANG wwang@ust.hk	C048	1: Heavy metal pollution in Pearl River Estuary.	<b>BISC only</b>
Prof. Zilong WEN zilong@ust.hk	C049	1: The development and function of regulatory T cells	
Prof. Joseph T Y WONG botin@ust.hk	C050	1: Dinoflagellate Life-cycles (literature studies)  Dinoflagellates are one of the most diverse group of aquatic protists (300 species) with almost all known nutritional modes (parasitic, photosynthetic, symbiotic...). In addition to the commonly diploid-haploid life cycle alternation, dinoflagellates have an array of complex life-cycle stages. The present project will explore the life-cycles of dinoflagellates at different levels, and their potential implications to large scale ecological phenomenon.	
Prof. Yung Hou WONG boyung@ust.hk	C051	1: Orphan G protein-coupled receptors	
	C052	2: G protein-coupled receptors in human cancers	
Prof. Angela Wu Angelawu@ust.hk	C053	1: Trends and challenges in using Circulating Tumor Cells in cancer diagnosis	
	C054	2: Hepatitis B virus - molecular mechanisms of viral activation and treatments	
Prof. Zhenguo WU bczgwu@ust.hk	C055	1: Molecular mechanisms that regulate beige fat formation in mice.	
	C056	2: Muscle stem cells and muscle regeneration.	
Prof. Hannah Hong XUE hxue@ust.hk	C057	1: Bioinformatic applications in integrated data mining	
	C058	2: Chinese herbal medicine with CNS activities	
	C059	3: GABAA receptor structure, function and genetics	
Prof. Yan YAN yany@ust.hk	C060	1: Drosophila as a cancer model	
Prof. Qinglu ZENG zeng@ust.hk	C061	1: Phage therapy	<b>Spring only</b>
	C062	2: Algal biofuel	
Prof. Mingjie ZHANG mzhang@ust.hk	C063	1: Why mutations of certain genes can cause psychiatric disorders to a selected portion of people.	<b>BCB only</b>
Prof. Guang ZHU gzhu@ust.hk	C064	1: Structure-functional study of pre DNA replication complex	
	C065	2: Structure-functional study of telomere repeat binding factors	
Prof. Jiguang WANG jgwang@ust.hk	C066	1. Genomic study of cancer evolution and intra-tumor heterogeneity;	<b>Updated: 4 May 2017</b>
	C067	2. Targeted cancer therapy and drug synergy effect.	