Part A) Topics for 2-semester Research Project Courses - Final Year Project (FYP) 2018/2019
(BISC) LIFS 4970/4980 (BCB) LIFS 4971/4981 (BIOT/BTGBM) LIFS 4973/4983
(IRE track) SCIE4500 / LIFS 4981 or 4983
CGA requirement: At 2.5 or above

Faculty name	Project code	Research topic	Remarks
Prof. David BANFIELD bodkb@ust.hk	A01	1. Using budding yeast to study mechanisms of protein transport and organelle biogenesis.	
Prof. Tom CHEUNG tcheung@ust.hk	A02	1. Investigating the role of new Rbfox2 isoform in regulating muscle stem cell proliferation.	
	A03	2. Investigating the role of metabolism regulation mediated by CPEB4 during Muscle stem cell activation.	
	A04	3. Post-transcriptional regulation of stem cell quiescence.	
	A82	4. Molecular characterization of cellular aging	Added on 16 May 2018
Prof. King CHOW bokchow@ust.hk	A05	1. Genetics of fan morphogenesis by genetic screen with KC62 or derivatives	**FYP Quota: 2**
	A06	2. Assembly of an array of assays and markers for ploidy monitoring in animals.	
	A07	3. In vitro analysis of protein-protein interaction affinity using dominant mutant protein to evaluate the protein complex formation in animal development, and the formulation of the molecular mechanism.	
	A08	4. Construction of chimeric G protein receptors and tuning of the animal communication efficacy by changing receptor repertoire and function.	
Prof. Kenny CHUNG bckchung@ust.hk	A09	1. Characterization of familial Parkinson's disease linked gene products	
Prof. Yusong GUO guoyusong@ust.hk	A10	1. Sorting of an apical cargo protein p75 at the trans Golgi network	**BISC or BCB only**
	A11	2: Reconstitution of vesicular release from the trans Golgi network using purified protein components	
Prof. Karl HERRUP herrup@ust.hk	A12	1: Control of cell number in the brain - a cell lineage analysis	
	A13	2: The role of ATM and ATR in vesicle trafficking as modeled with Tel1 and Mec1 in yeast	
	A14	3: Screening marine bacterial extracts for neuroprotective properties.	
Prof. Pingbo HUANG bohuangp@ust.hk	A15	1. Assessment of hearing loss of mutant mouse lines	
	A16	2. Biochemical and cell biological study of TMC1 function as mechanotransducer channel in hearing	
Prof. Nancy Ip Contact via: Prof. Amy Fu boamy@ust.hk	A17	1. CRISPR/Cas-mediated genome editing in iPSCs	
	A18	2. Transcriptome profiling of iPSC-derived neural cells	
	A19	3. Regulation of microglial phenotype in Alzheimer's disease	
Prof. Toyotaka ISHIBASHI toyotaka@ust.hk	A20	1. Investigating nucleosomal dynamics by single-molecule optical tweezers	
	A21	2. Studying the function of epigenetically modified histones	
	A22	3. Elucidating RNA polymerase transcription elongation mechanism and effects of transcription elongation factors	
	A23	4. Functional and molecular study on viral and yeast polymerases.	
Prof. Robert K M KO bcrko@ust.hk	A24	1. The effect of herbal formulation or active compounds on fatty liver.	**FYP Quota: 1-2**
Prof. Stanley C K LAU scklau@ust.hk	A25	1. Bacterioplankton community structure in relation to environmental gradients between the Pearl River Delta and the open waters adjacent to HK.	
Prof. Danny Leung	A26	1. Identification of epigenetic changes in cancer	

dcyleung@ust.hk	A27	2. Epigenetic analysis of stem cells	
Prof. Ning LI boningl@ust.hk	A28	1. Proteomics and molecular biological study of hormone and force signaling in a model plant Arabidopsis.	
Prof. Chun LIANG bccliang@ust.hk	A29	1. Studies of yeast DNA replication proteins.	
	A30	2. Identification and characterization of cancer drug candidates.	
Prof. Hongbin LIU liuhb@ust.hk	A31	1. Thermal preference of marine Synechococcus strains and their responses to global warming	
	A32	2. Continuous monitoring of phytoplankton community composition in Port Shelter	
	A33	3: Carbon to Nitrogen ratio in different cyanobacteria	
Prof. Kai LIU kailiu@ust.hk	A34	1: Molecular mechanisms regulating axon regeneration in adult neurons	**Preference: BCB students**
	A35	2: Visual and non-visual functions of intrinsically photosensitive retinal ganglion cells	
Prof. Ho Yi MAK hym@ust.hk	A36	1. Using CRISPR to generate transgenic strains for monitoring fat storage in *C. elegans*	
	A37	2: Using CRISPR to generate transgenic strains for hunger detection in *C. elegans*	
Prof. Andrew L MILLER almiller@ust.hk	A38	1. Exploring the use of fish scales as a possible complementary model to study bone development, disease and regeneration.	
	A39	2. Exploration of the role of Ca^{2+} signaling during the formation and function of Kupffer's Vesicle and what, if any, influence does this have on early heart development.	
Prof. Tuan Anh NGUYEN tuananh@ust.hk	A40	1. RNA helicase purification and characterization.	
	A41	2. The processing of primary microRNAs.	
	A42	3. Bioinformatics analysis of primary microRNA processing	
Prof. Hyokeun PARK hkpark@ust.hk	A43	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.	
	A44	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	
	A45	3. Real-time imaging of single motor proteins.	
	A46	4. Building a computational model of synaptic transmission in inhibitory synapses.	
	A47	5. Building a model of the motion of single synaptic vesicles in synapses.	
	A48	6. [Colloration with Prof Levent Yobas] Exploring microfluidic devices for specific bio-applications and techniques.	
Prof. Randy Y C POON rycpoon@ust.hk	A49	1. Conditional knockout of essential genes in cancer cells	
	A50	2. Development of a technique for inducting DNA damage specifically in cancer cells	
Prof. Robert Zhong QI qirz@ust.hk	A51	1. Molecular and cell biology of cytoskeletons during the cell cycle	
	A52	2. Cloning and characterization of novel microtubule regulators	
Prof. Peiyuan QIAN boqianpy@ust.hk	A53	1. Genome mining guided novel antibiotics discovery from marine bacteria	
	A54	2. Marine Biofilm Microbiome	
	A55	3. The cross talk between molecular signaling pathway and biofilm in common fouling tube worm, *Hydroides elegans.*	
Prof. Julia L. SEMMELHACK jsemmelhack@ust.hk	A56	1. Neural circuits for eye movements in zebrafish	
	A57	2. Behavioral analysis of zebrafish prey capture	
Prof. Karl TSIM botsim@ust.hk	A58	1. Development of Chinese medicine as health food products in Hong Kong.	
	A59	2. Quality control of Chinese herbs: chemical and biological analyses.	
Prof. Jiguang WANG jgwang@ust.hk	A60	1. Deep learning of digital pathology and the application in medicine;	

Prof. Wenxiong WANG wwang@ust.hk	A61	1. Metal pollution in Hong Kong waters	
	A62	2. Nanotoxicology in marine environments.	
Prof. Zilong WEN zilong@ust.hk	A63	1: Study of hematopoietic cell development in zebrafish	
Prof. Joseph T Y WONG botin@ust.hk	A64	1. Isolation and Characterization of dinoflagellates from Hong Kong waters **Description:** 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). The present project aims to isolate and characterize dinoflagellates from Hong Kong waters. (e.g. varying temperature, pH, salinity) and understand their response (e.g. morphological adaption) to different stress conditions.	**FYP quota: 1-2**
Prof. Wan Keung WONG bcwkrw@ust.hk	A65	1: Expression of valuable proteins in *Escherichia coli*	BISC and BIOT only
	A66	2: Expression of valuable proteins in *Bacillus subtilis*	
	A67	3: Demystifying the mechanisms for intein-extein cleavages	
	A68	4: Study of synergistic action among recombinant cellulases on cellulose degradation	
Prof. Yung Hou WONG boyung@ust.hk	A69	1. Drug-induced upregulation of metastasis suppressors	
	A70	2. GPCR-mediated intercellular communication between neurons and astrocytes	
Prof. Angela Wu Angelawu@ust.hk	A71	1. Single-cell RNA profiling in cancer	
Prof. Zhenguo WU bczgwu@ust.hk	A72	1: Identification of Paxbp1-interacting proteins.	
Prof. Jun XIA Jxia@ust.hk	A73	1. Intracellular protein trafficking and its role in diseases such as Alzheimer's and diabetes.	
	A74	2. Molecular mechanism of synapse formation, function and autism	
Prof. Yan YAN yany@ust.hk	A75	1: Genetic screening of genes involved in cell competition.	
	A76	2: Genetic screening of genes involved in single cell delamination	
Prof. Qinglu ZENG zeng@ust.hk	A77	1. Isolation and sequencing of cyanobacterial viruses from the South China Sea	
	A78	2. Evolution of cyanobacterial viruses with different host strains	
Prof. Guang ZHU gzhu@ust.hk	A79	1: DNA replication at telomere	
	A80	2: Structure-function of telomeric G4 DNA	
	A81	3: Structure-function mammalian pre DNA replication complex	

Part B) Topics for 1-semester Capstone course – UG Research project 2018/19
(BISC) LIFS4960 (BCB) LIFS 4961 (BIOT/BTGBM) LIFS 4963

Faculty name	Project code	Research topic	Remarks
Prof. Karen Kit Yu CHAN karenchan@ust.hk	B01	1. Biomechanics of swimming of marine invertebrate larvae	Fall 2018 only
	B02	2. Dynamic energy budget model of mussel	
Prof. Toyotaka ISHIBASHI toyotaka@ust.hk	B03	1. The effect of post-translational modified histones in nucleosome stability	Only Fall or Spring
	B04	2. Identifying transcription regulation factors	
Prof. Tuan Anh NGUYEN tuananh@ust.hk	B05	1. RNA helicase purification and characterization.	Summer2018/ Fall2018/ Spring2019
	B06	2. The processing of primary microRNAs.	
	B07	3. Bioinformatics analysis of primary microRNA processing	

Part C) Topics for 1-semester Capstone course – UG Literature review 2018/19
(BISC) LIFS4960 (BCB) LIFS 4961 (BIOT/BTGBM) LIFS 4963

Faculty name	Project code	Topic for Literature review	Remarks
Prof. David K BANFIELD bodkb@ust.hk	C01	1. Using budding yeast to study mechanisms of protein transport and organelle biogenesis.	
	C02	2. How cells respond to changes in nutrient levels.	
Prof. Karen Kit Yu CHAN karenchan@ust.hk	C03	1. Mechanosensation in marine invertebrate larvae	Fall 2018 only
	C04	2. Size-neuronal number scaling in marine invertebrates	
	C05	3. Review on tropical marine invertebrates data in the Global Biodiversity Information Facility (GBif)	
Prof. Tom Hiu Tung CHEUNG tcheung@ust.hk	C06	1: Epigenetic regulation of somatic stem cells	
	C07	2: Stem cell ageing	
Prof. Kenny K CHUNG bckchung@ust.hk	C08	1: Factors that contribute to neurodegenerative disorders	Only Fall or Spring
Prof. Yusong GUO guoyusong@ust.hk	C09	1. Molecular mechanisms that regulate peroxisome biogensis	**BISC or BCB only**
	C10	2. Molecular mechanisms that regulate export of cargo proteins out of the endoplasmic reticulum	
Prof. Karl HERRUP herrup@ust.hk	C11	1. Control of cell number in the brain - a cell lineage analysis	
	C12	2. The role of ATM and ATR in vesicle trafficking as modeled with Tel1 and Mec1 in yeast	
	C13	3. Screening marine bacterial extracts for neuroprotective properties.	
Prof. Pingbo HUANG bohuangp@ust.hk	C14	1. Aminoglycoside antibiotics and their ototoxicity: the past, the present, and the future.	
	C15	2. Mechanism of auditory frequency tuning- how does our auditory system sense sound frequencies?	
Prof. Robert K M KO bcrko@ust.hk	C16	Biochemical basis of metabolic diseases	**Max. quota : 4**
Prof. Stanley C K LAU scklau@ust.hk	C17	1: Effects of microbial activities on climate.	
	C18	2: The microbiology of cheese making	
Prof. Danny Leung dcyleung@ust.hk	C19	1. Epigenomics and Transcriptional Regulation	Summer 2018 or Spring2019
	C20	2. Role of non-coding DNA in development	
Prof. Ning LI boningl@ust.hk	C21	1. Mass spectrometry-based analysis of protein-protein interactions and molecular networks in Arabidopsis cell.	
Prof. Chun LIANG bccliang@ust.hk	C22	1. Drug research and development strategies	
	C23	2. Chinese medicine research and development strategies	
Prof. Kai LIU kailiu@ust.hk	C24	1: Molecular mechanisms regulating axon regeneration in adult neurons	**BCB is preferred**
	C25	2: Visual and non-visual functions of intrinsically photosensitive	

		retinal ganglion cells	
Prof. Ho Yi MAK hym@ust.hk	C26	1. The molecular basis of fatty acid absorption	Only Fall or Spring
	C27	2. The biology of brown fat tissue	
Prof. Andrew L MILLER almiller@ust.hk	C28	1: Literature review on gene expression during heart development that is regulated by circadian clock activity using the zebrafish as a vertebrate model.	
	C29	2: Literature review on the role of Ca2+ signaling during the development of the two chambered heart of teleost fish.	
	C30	3: Literature review on the development of the early neuronal circuitry in the zebrafish spinal cord that is responsible for generating the first muscle-generated movements in the trunk of the fish.	
	C31	4. Literature review on heart regeneration after injury: Comparing the extent achieved in different vertebrate species.	
Prof. Tuan Anh NGUYEN tuananh@ust.hk	C32	1: RNA helicases and virus infection.	
	C33	2: RNA helicases and microRNA biogenesis.	
	C34	3: RNA helicases in cancers.	
	C35	4: RNA helicases in neurodegenerative diseases.	
	C36	5: MicroRNA application.	
Prof. Hyokeun PARK hkpark@ust.hk	C37	1: Investigating whether mutant Huntingtin proteins affect mobility of organelles.	
Prof. Randy Y C POON rycpoon@ust.hk	C38	1: Tasmanian devil and transmittable cancers	
	C39	2: Conception and misconception: a survey of the use of biological concepts in advertising	
Prof. Robert Zhong QI qirz@ust.hk	C40	1. Centrosome aberrations and cancer development	
	C41	2. Development of left–right visceral pattering in vertebrates	
Prof. Peiyuan QIAN boqianpy@ust.hk	C42	1. Genome mining guided novel antibiotics discovery from marine bacteria	
	C43	2. Marine Biofilm Microbiome	
	C44	3. The cross talk between molecular signaling pathway and biofilm in common fouling tube worm, Hydroides elegans.	
Prof. Julia L. SEMMELHACK jsemmelhack@ust.hk	C45	1. Mechanisms of collective behaviors	**Fall 2018 only**
	C46	2. Eye movements in vertebrates; structure, function and evolution.	
Prof. Karl TSIM botsim@ust.hk	C47	1: Current market for Chinese medicine in Hong Kong and China.	
	C48	2: Safety of Chinese medicine: what can we do to control that in Hong Kong market.	
Prof. Jiguang WANG jgwang@ust.hk	C49	1. Computational methods in single-cell sequencing	
Prof. Wenxiong WANG wwang@ust.hk	C50	1: Heavy metal pollution in Pearl River Estuary.	
	C51	2. Nanotoxicology in marine environments.	
Prof. Zilong WEN zilong@ust.hk	C52	1.The development of hematopoietic stem cells	
	C53	2.The role of PU.1 transcription factor in myeloid cell development	
Prof. Joseph T Y WONG botin@ust.hk	C54	1. Dinoflagellate Life-cycles Dinoflagellates are one of the most diverse group of aquatic protists (3000 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 leve and their potential implications to large scale ecological phenomenon.	
Prof. Yung Hou WONG boyung@ust.hk	C55	1. Orphan G protein-coupled receptors	
	C56	2. G protein-coupled receptors in human cancers	
Prof. Angela Wu Angelawu@ust.hk	C57	1. Role of viruses in cancer	
Prof. Zhenguo WU bczgwu@ust.hk	C58	1: Molecular mechanisms that regulate beige fat formation in mice.	
	C59	2: Muscle stem cells and muscle regeneration.	
Prof. Jun XIA Jxia@ust.hk	C60	1. The molecular mechanisms of learning and memory	
	C61	2. Autism: gene and disease	
Prof. Yan YAN yany@ust.hk	C62	1. Mechanism of cell competition;	

	C63	2: Mechanism of single cell delamination	
Prof. Qinglu ZENG zeng@ust.hk	C64	1. Phage therapy	**Spring only**
	C65	2. Algal biofuel	
Prof. Guang ZHU gzhu@ust.hk	C66	1: Structure-functional study of pre DNA replication complex	
	C67	2: Structure-functional study of telomere repeat binding factors	