美國留學、職涯分享

工科14 謝靖恆

講者簡歷

2014 **工科系畢業**
主修電子組、物理組

2014 **巫老師實驗室**
研究助理

2015 **UC San Diego**
MS, Electrical and Computer Engineering

2016 **Hewlett Packard**
Electronics Engineering Intern

2017 **Qualcomm**
ASIC Design Engineer

分享主題

碩士班定位

如何選校、選program

碩士求職過程

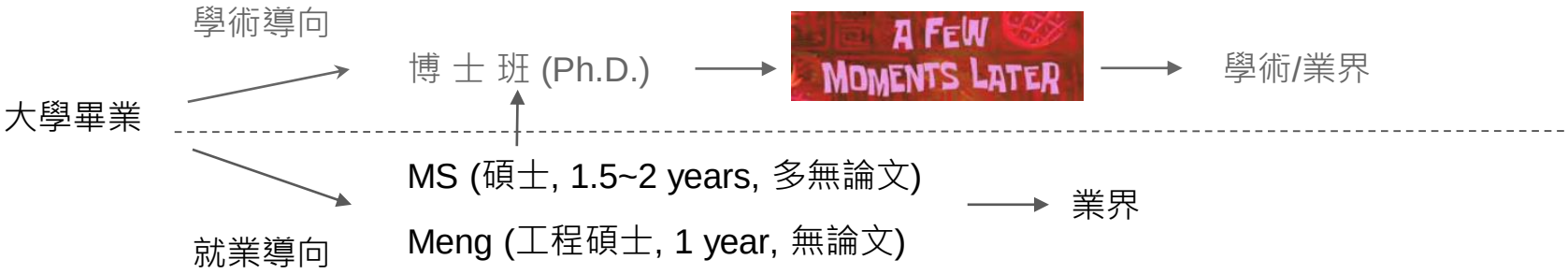
我離理想的職位有多遠?

移民、簽證問題

評估薪資待遇

我能開始做些什麼

美國碩士班定位



因校系而異：

Semester制 (一年兩學期) vs Quarter制 (一年三學期)

畢業考 vs 畢業論文

在美國讀碩士代價? 學費生活費: 粗估300萬台幣

美國碩士班課業

- 節奏較緊湊
- 評分內容包含:
  作業、期中期末、lab
  、final project等
- 一學期通常修三門課
- 修課+研究+找實習/工作
  難度高

Date	Lecture	Assignment
Thr 9/24	Integrated Circuit Technology	
Tue 9/29	Long Channel MOS Physics	
Thr 10/1	Common Source Amplifier, Small-Signal Model	HW 1 out
Tue 10/6	Small-Signal Model, SPICE	
Thr 10/8	Frequency Response	HW 2 out, HW 1 due
Tue 10/13	Frequency Response	
Thr 10/15	Common Gate Amplifier, Common Drain Amplifier	HW 3 out, HW 2 due
Tue 10/20	Cascodes	
Thr 10/22	Differential Amplifiers	HW 3 due
Tue 10/27	Differential Amplifiers	
Thr 10/29	**Midterm**	HW 4 out
Tue 11/3	Current Mirrors and Bias Network Design	
Thr 11/5	Supply Independent Biasing	HW 5 out, HW 4 due
Tue 11/10	Multistage Amplifiers	
Thr 11/12	Process Variation, Mismatch	HW 5 due, Project Out
Tue 11/17	Feedback	
Thr 11/19	Feedback	
Tue 11/24	NO CLASS (Thanksgiving Holiday)	
Thr 11/26	NO CLASS (Thanksgiving Holiday)	
Tue 12/1	Operational Transconductance Amplifiers	Project Due
Thr 12/3	Course Summary	
Wed 12/9	**Final Exam (11:30 – 2:30 PM)**	

$300萬可以買到什麼?

期望	文化交流	外語學習	課程資源	研究機會	理想工作
常見困境	課業太忙、 生活圈隔閡	都跟台灣or中國 人討論作業	課沒開、必修衝 堂、課堂額滿	教授沒錢、修課 太忙	簽證問題、領域 開缺少

結論: 不要來美國讀碩士!!?

設法**最大化碩士留學價值** - 光學位本身遠遠不足

申請留學前：

- 基本配備：**GPA (3.5+)**、托福、GRE、履歷、推薦信、SOP 等
- 選擇適合的學校、program

  提前考慮碩畢後職涯發展：薪資待遇、移民簽證等等

選校、選program

名校 ≠ 職涯發展保證 排名非唯一依據

- 校系擅長領域 - 各領域教授數量
- 畢業條件 (畢業考、論文)
- 開課內容
- 研究機會、產學合作*
- 地域、學長姐畢業去處*

多數資訊各校網站都找得到 選校前要仔細閱讀

*比較難在官方公布找到訊息，各校的台灣學生會社團是你的好夥伴

以UCSD ECE網站為例

ECE offers graduate programs leading to the M.S. and Ph.D. degrees, with specializations in:

- Applied Electromagnetics
- Applied Ocean Sciences
- Applied Physics - Electronic Devices and Materials
- Communication Theory and Systems / Magnetic Recording
- Computer Engineering *(Impacted Major*)*
- Electronic Circuits and Systems *(Impacted Major*)*
- Intelligent Systems, Robotics, and Control *(Impacted Major*)*
- Machine Learning and Data Science *(Impacted Major*)*
- Medical Devices and Systems
- Nanoscale Devices and Systems
- Photonics
- Signal and Image Processing

*You must be admitted into impacted majors directly. You may not switch into these if you are admit

UC San Diego
Electrical and Computer Engineering

ECE Graduate Student Affairs
EBU 1, 2nd Floor
ece-gradoffice@ece.ucsd.edu

M.S. / Ph.D. Degree Planner: Applied Physics—Electronic Devices & Materials (EC76) 2019-2020

- Minimum of 12 units (Plan 1) or 14 units (Plan II) must be 201+ ECE courses that must count towards your degree.
- All courses counted towards the degree must be taken for a letter grade.

Core Coursework (12 Units):

ECE 230A-B-C	Solid State Electronics I, II, III

Quarter/Core Course	
	ECE 230A
	ECE 230B
	ECE 230C
Total: 12 Units	

Any two of the following 12 unit sequences (24 units):

ECE 212AN-BN-CN*	Principles of NanoScience & NanoTechnology, NanoElectronics, NanoPhotonics
ECE 222A-B-C	Antennas & Their System Applications, Applied Electromagnetic Theory- Electromagnetics, Computational Methods for Electromagnetics
ECE 236A-B-C	III-IV Compound Semiconductor Materials, Optical Processes in Semiconductors, Heterojunction Field Effect Transistors
ECE 238A-B, MATS 201C	Thermodynamics of Solids, Solid State Diffusion & Reaction Kinetics, Phase Transformations
ECE 240A-B-C	Laser & Optics, Optical Information Processing, Optical Modulation & Detection
ECE 251A-B-C-D**	Digital Signal Processing I & II, Filter Banks & wavelets, Array Processing
ECE 260A-B-C	VLSI Digital System Algorithms & Architectures, Integrated Circuits & Systems Design, Advanced Topics
MATH 210A-B-C	Mathematical Methods in Physics & Engineering
PHYS 211A, 212A-B	Solid-State Physics I, Quantum Mechanics I & II

Quarter/Add. Units	
Total: 24 Units	

*Students cannot receive credit for both ECE 212A & 212AN, 212B & 212BN or 212C & 212CN
**Students may choose any three of the four courses listed for ECE 251

Technical Electives (12 Units)

- Any 4 unit, 200+ course from ECE, CSE, MAE, BENG, CENG, NANO, SE, MATS, MATH, or PHYS taken for a letter grade may be counted. Exceptions to this list require departmental approval.
- Up to 12 units of undergraduate ECE coursework (ECE 111+ only*) OR up to two 4-unit course of undergraduate ECE coursework (ECE 111+ only*) and one 4-unit course of CSE undergraduate coursework (CSE 100+ only**) may be counted.
- MS students (Plan II) are allowed no more than 4 units of ECE 299 (research units) as technical electives. PhD and MS students (Plan I) are allowed no more than 8 units of ECE 299 as technical electives.

Quarter/Tech. Electives	
Total: 12 Units	

- 組內必修規定
- 大學部、系外抵免規定
- 開課頻率

ref:
http://www.ece.ucsd.edu/graduate/graduate-admissions

以UCSD ECE網站為例 - 開課狀況

ACADEMIC YEAR: 2019-2020

Class listings and faculty are proposed and subject to change. Click on the instructor's name for the class website.

COURSE	FALL 19	WINTER 20	SPRING 20
ECE 5 Experience ECE: Making, Breaking, Hacking Stuff	NGUYEN, GILJA, HALL, ELDON	NGUYEN, GILJA, HALL	NGUYEN, GILJA, HALL
ECE 15 Engineering Computation	SCHURGERS	SCHURGERS	VARDY
ECE 16 Rapid Hardware and Software Design	KHOSHABEH	WANG	KHOSHABEH
ECE 17 Object-Oriented Programming: Design and Development with C++	GESSNER		GILJA
ECE 25 Introduction to Digital Design	QUEST	DEY	LIU
ECE 30 Introduction to Computer Engineering		YUN	MIRARAB
ECE 35 Introduction to Analog Design	SCHURGERS SCHURGERS	TAUR	SCHURGERS
ECE 45 Circuits & Systems	LUGANNANI	ZEGER	LUGANNANI
ECE 65 Components & Circuits Laboratory	BAGHDADCHI	BAGHDADCHI	BAGHDADCHI

Graduate

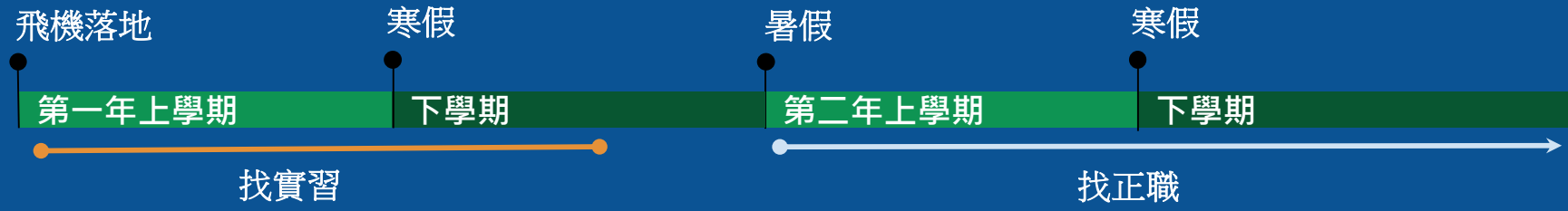
ECE 200. Research Conference (2)
Group discussion of research activities and progress of group members. (Consent of instructor is strongly recommended.) (S/U grades only.) ***Prerequisites:*** graduate standing.

ECE 201. Introduction to Biophysics (4)
The class will cover fundamental physical principles of biological processes at the molecular, cellular, tissue and organ levels that are related to human physiology and diseases. Topics include energetics and dynamics of biological systems, physical factors of environment, and the kinetics of biological systems. ***Prerequisites:*** senior or graduate level standing.

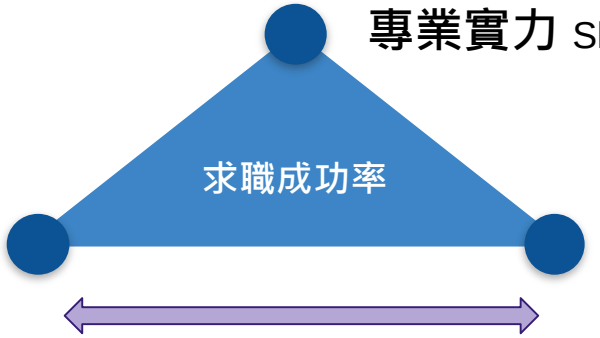
ECE 202. Medical Devices and Interfaces (4)
This course will cover basic cellular and electrochemical processes, membrane potentials, ionic currents, nerve cell conductance, extracellular and intracellular stimulation, neural probe technology materials and devices, diagnostic and drug delivery devices, material/physiological considerations, biosensors, microfluids, optical, magnetic and electrical screening. ***Prerequisites:*** senior or graduate level standing.

ECE 203. Biomedical Integrated Circuits and Systems (4)
Integrated circuit analysis and design for medical devices. Introduction to subthreshold conduction in MOS transistor and its similarities to biomolecular transport. Design of instrumentation amplifiers, sensors, and electrical stimulation interfaces. Transcutaneous wireless power transfer and electromagnetic effects on tissue. Recommended preparation: ECE 164 or BENG 186B or equivalent. ***Prerequisites:*** senior or graduate level standing.

碩士求職時程



影響求職因素



專業實力 Skillset, 溝通能力

職場經驗

相關領域正職>>實習>>學校專題

外商、大公司>其他

市場需求

該領域人才需求程度

(ex: 資工>電機>材料機械...)

美國經濟狀況

我離理想的職位有多遠? - 職缺要求　以Intel製程工程師為例

Home › Explore Jobs › Process Engineer Phoenix, AZ

Job ID: JR0124775
Job Category: Engineering
Primary Location: Phoenix, AZ US
Other Locations:
Job Type: Experie

Job Type: Experienced Hire

Process Engineer

Job Description

Process Engineers design and plan the layout for such processes as hardening, washing, laminating, etching, engraving, polishing, painting, plating, and other material processing operations. Plans sequence of operations and specifies procedures for cutting, shaping, and otherwise preparing basic material, exercising judgment in compromising between conflicting requirements, economic evaluation of methods, and operator effectiveness and comfort. Conducts tests and measurements throughout stages of production to determine control over such variables as temperature, density, specific gravity, pressure, and viscosity. Establishes and submits processing requirements to be met in designing and acquiring processing equipment. Responds to customer/client requests or events as they occur. Develops solutions to problems utilizing

能否於校內或實習獲得這些技能?

Minimum Requirements:

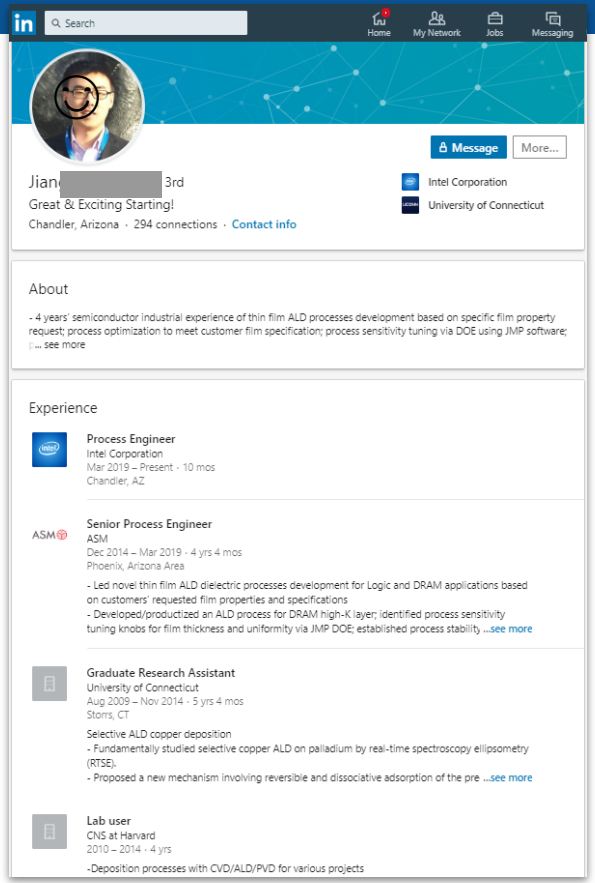
- Master's or Ph.D"s Degree in Materials Science, Electrical Engineering, Mechanical Engineering, Optical Engineering, Chemical Engineering, Chemistry, Applied Mechanics, or Physics.
- 5+ years experience in CMP, preferably with low K dielectric polish and metals polish.

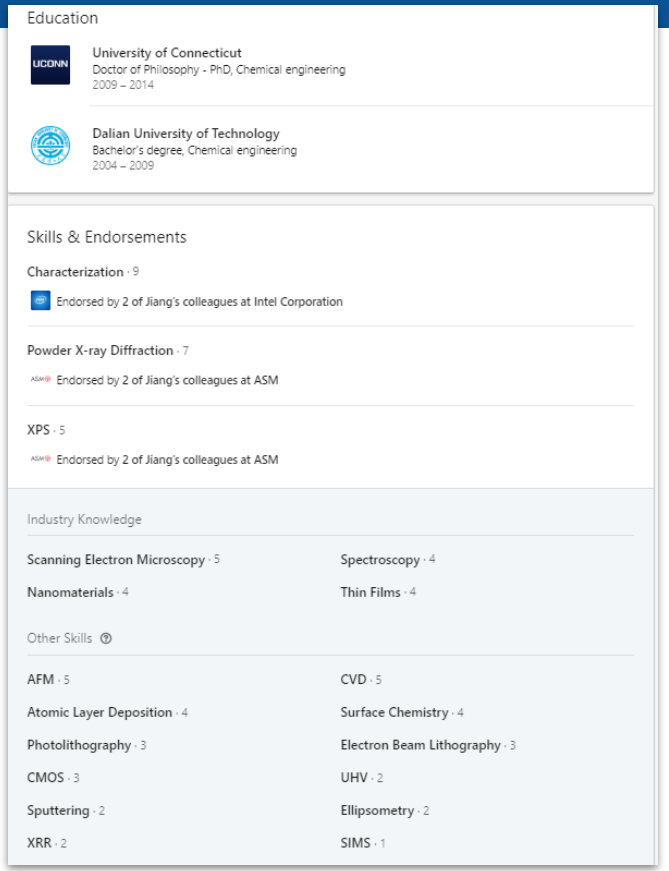
Preferred Qualifications:

- Experience with:
- Data analysis (JMP, SPC, MATLAB, Mathematica)
- Design of experiment (DOE) principles
- Semiconductor processes (Thin Films, Diffusion, Planar, Implant, Litho, Etch, and/or Metrology)
- Understanding the relationship between processing versus microstructure versus mechanical and physical properties of materials (polymers, composites, metals, and ceramics)
- Working with fracture and adhesion mechanisms of materials and material interfaces

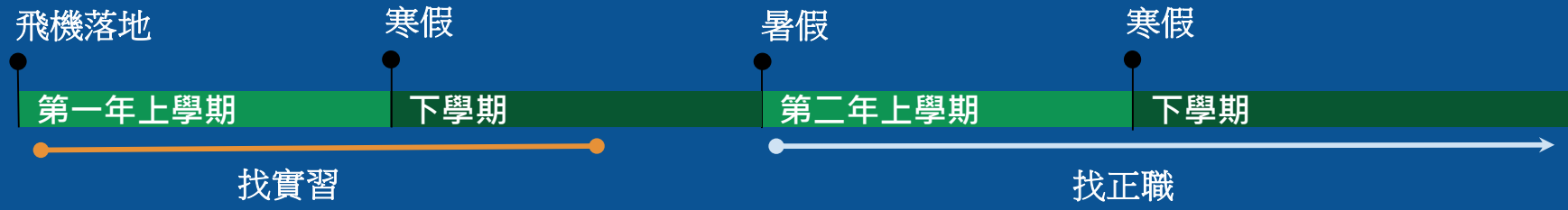
我離理想的職位有多遠? - 自我條件

- 參考前人經驗、經歷
- 相關技能能否藉由學位、實習獲得
- Linkedin: 專業版的臉書
  - 建立線上履歷
  - 尋找職缺
  - 聯絡人資





碩士求職時程



面試流程 - 以高通硬體工程師為例

履歷篩選

英文履歷，由人資、主管挑選

(學期初career fair、內推、海投)

Phone Interview

1~2輪

1小時電話面試篩選

基本專業知識、提問過去經驗

On-site Interview

1~2輪

全天面試 一小時一輪 共5~8輪

白板解題、討論溝通、專業知識

Offer

人資、主管、經理討論offer

移民、工作簽證*

		內容	不確定因素
非移民傾向	**F1 - CPT** 學生簽證 - 實習工作許可	就學滿一年 實習與所學相關	與所學相關定義
非移民傾向	**F1 - OPT** 學生簽證 - 畢業工作許可	完成學位可取得 (最多畢業後5個月內須找到工作) 工作與所學相關 一年、STEM領域可延長兩年	與所學相關定義 90天失業期
Dual intent	**H-1B** 工作簽證	需雇主贊助 一次三年，可延長一次 若雇主幫助申請綠卡，可持續延長	須抽籤，單次50%+ 60天失業期
移民傾向	**綠卡** 永久居民	需雇主贊助 PERM, I-140, I-485 台灣人約3年	S.386法案

*詳細規定以官方公布為準

薪水多少合理？work life balance?

聽鄉民說 5萬 10萬 20萬 50萬 代表什麼？

薪資組成：

Base salary, — **底薪**
Sign-on bonus, — 簽約金
RSU, — 股票(分年領)
Annual bonus. — 年終

} **Total Compensation (TC)**

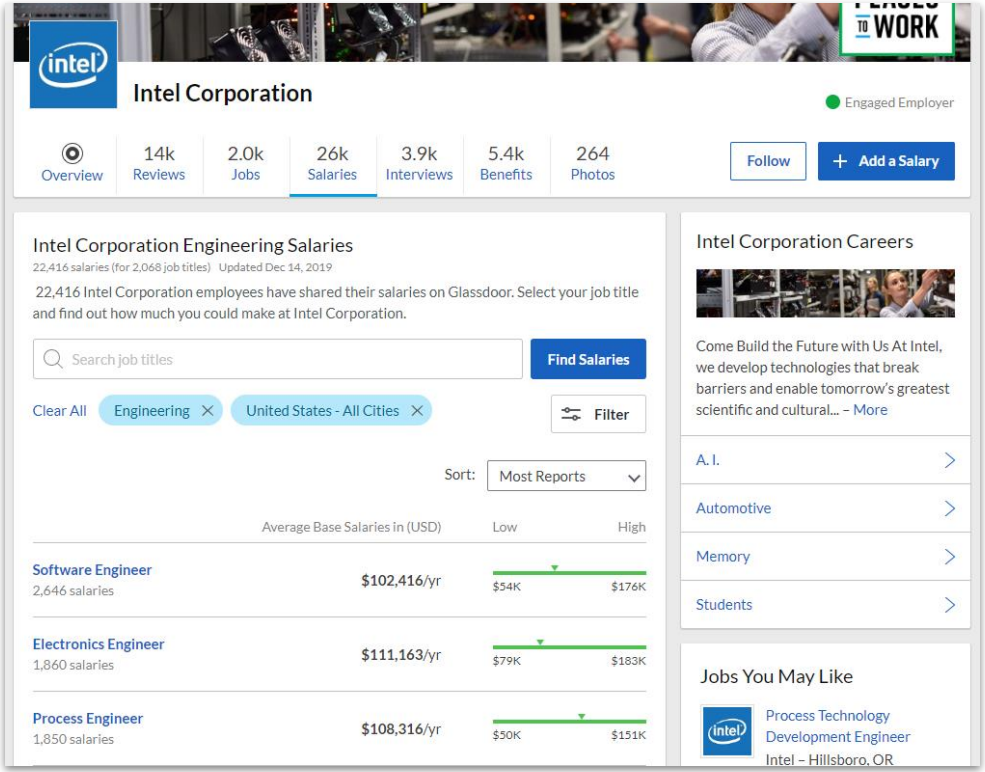
薪水行情參考：

Glassdoor - https://www.glassdoor.com/

h1b salary database - https://h1bdata.info/

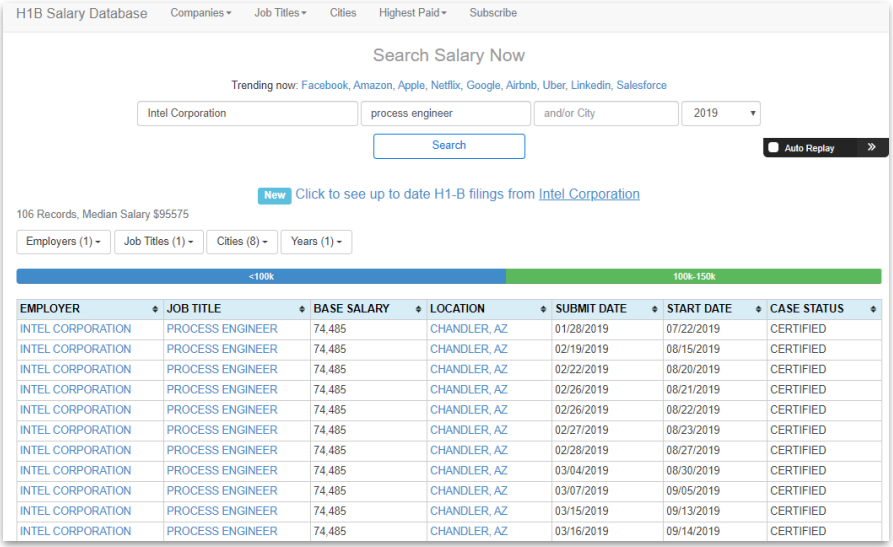
Glassdoor -

https://www.glassdoor.com/



h1b salary database -

https://h1bdata.info/

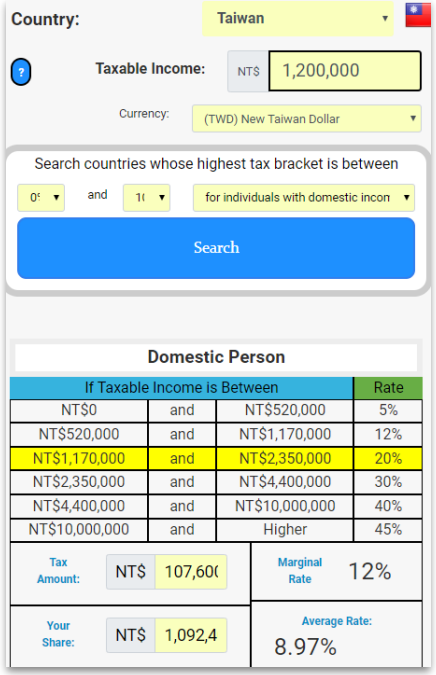


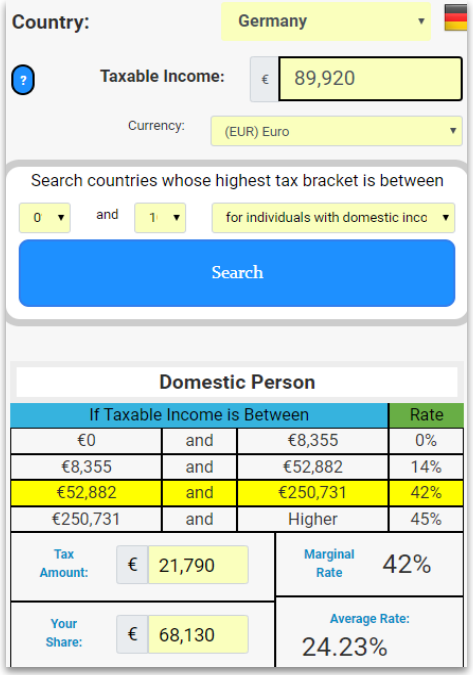
EMPLOYER	JOB TITLE	BASE SALARY	LOCATION	SUBMIT DATE	START DATE	CASE STATUS
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	01/28/2019	07/22/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/19/2019	08/15/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/22/2019	08/20/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/26/2019	08/21/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/26/2019	08/22/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/27/2019	08/23/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	02/28/2019	08/27/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	03/04/2019	08/30/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	03/07/2019	09/05/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	03/15/2019	09/13/2019	CERTIFIED
INTEL CORPORATION	PROCESS ENGINEER	74,485	CHANDLER, AZ	03/16/2019	09/14/2019	CERTIFIED

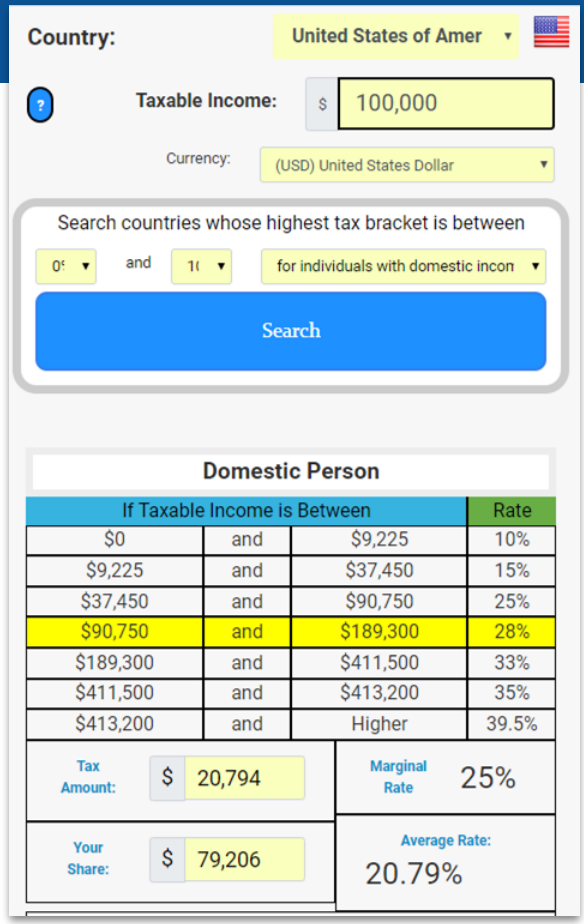
關於所得稅

關於稅：聯邦稅+州稅 (可以30%估計)

https://www.irscalculators.com/international-tax-calculator (僅供參考)

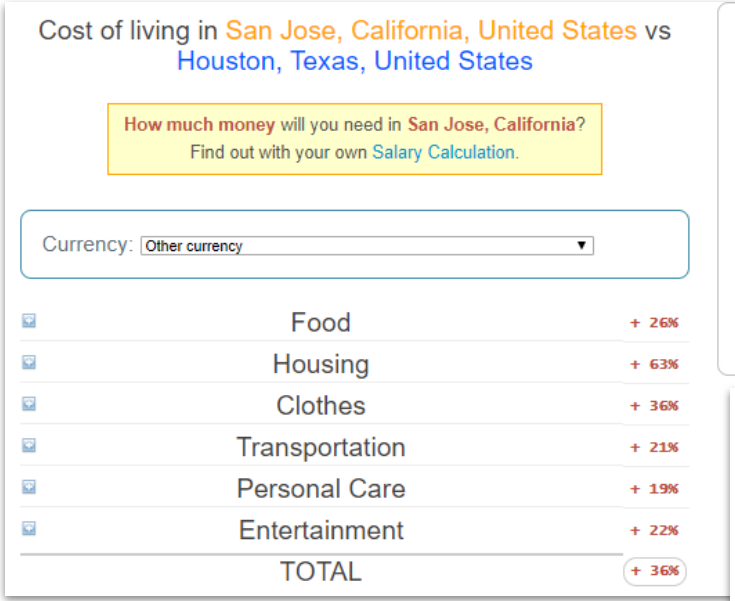






未計入州稅

關於物價 Cost of living 矽谷$1 ≠ 休士頓$1



Cost of living in San Jose, California, United States vs Houston, Texas, United States

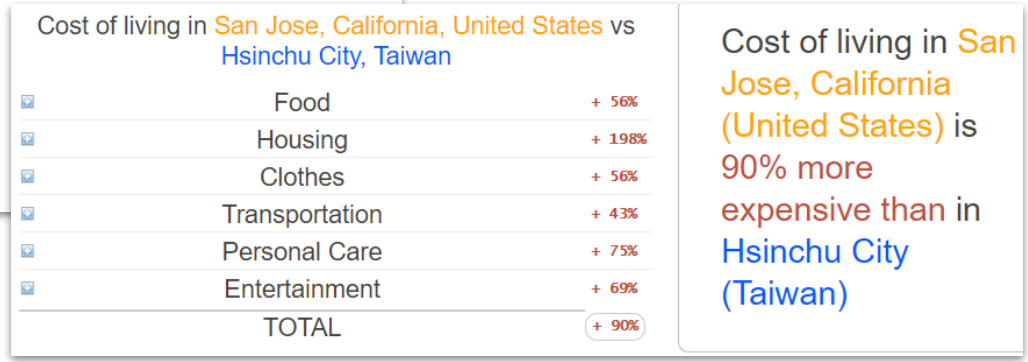
How much money will you need in San Jose, California?
Find out with your own Salary Calculation.

Currency: Other currency

Food	+ 26%
Housing	+ 63%
Clothes	+ 36%
Transportation	+ 21%
Personal Care	+ 19%
Entertainment	+ 22%
TOTAL	+ 36%

Cost of living in San Jose, California (United States) is 36% more expensive than in Houston, Texas (United States)

需依照個人需求、生活方式評估



Cost of living in San Jose, California, United States vs Hsinchu City, Taiwan

Food	+ 56%
Housing	+ 198%
Clothes	+ 56%
Transportation	+ 43%
Personal Care	+ 75%
Entertainment	+ 69%
TOTAL	+ 90%

Cost of living in San Jose, California (United States) is 90% more expensive than in Hsinchu City (Taiwan)

https://www.expatistan.com/cost-of-living

[問卦] 台灣 vs 美國，東岸 vs 西岸，亞洲 vs 歐洲?

客觀條件：

工作機會、薪水、稅率、物價

主觀條件：

生活方式、飲食習慣、家人、伴侶等

正確運用人脈 - 獲得第一手資訊

詢問個別校系、工作職缺問題:

Ex: 特定校系學生找工作狀況

推薦課程

特定研究室風氣

留學生活撇步

內推 (Internal Referral)：

最有效的求職方式

認識新朋友

- 如何與陌生人開啟對話

1. 概略自我介紹和目的

2. 詳述問題

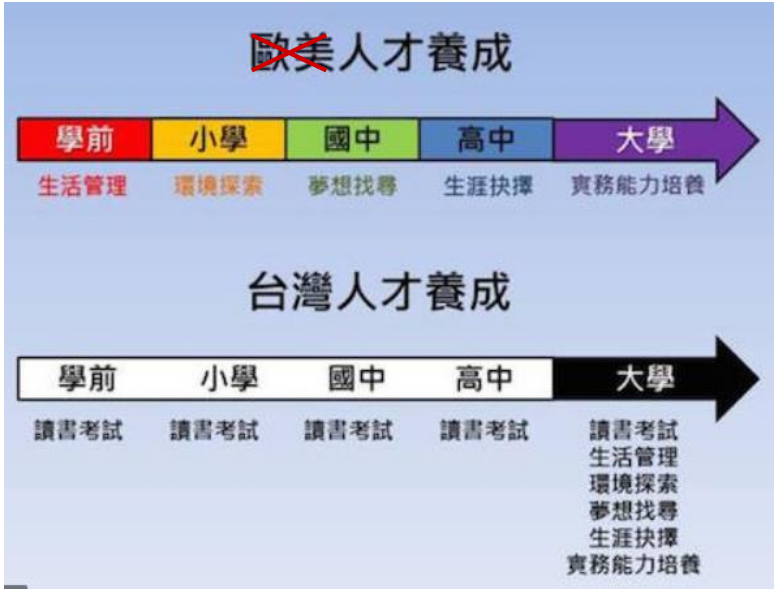
- **我想獲得什麼幫助**
- 我的目標
- 對於這個目標我有什麼基礎

3. 適當追問

4. 結束對話

5. 回報後續 - 表示重視,維持連結

我能開始做些什麼? - 不論要不要留學



顧好GPA=顧好身體

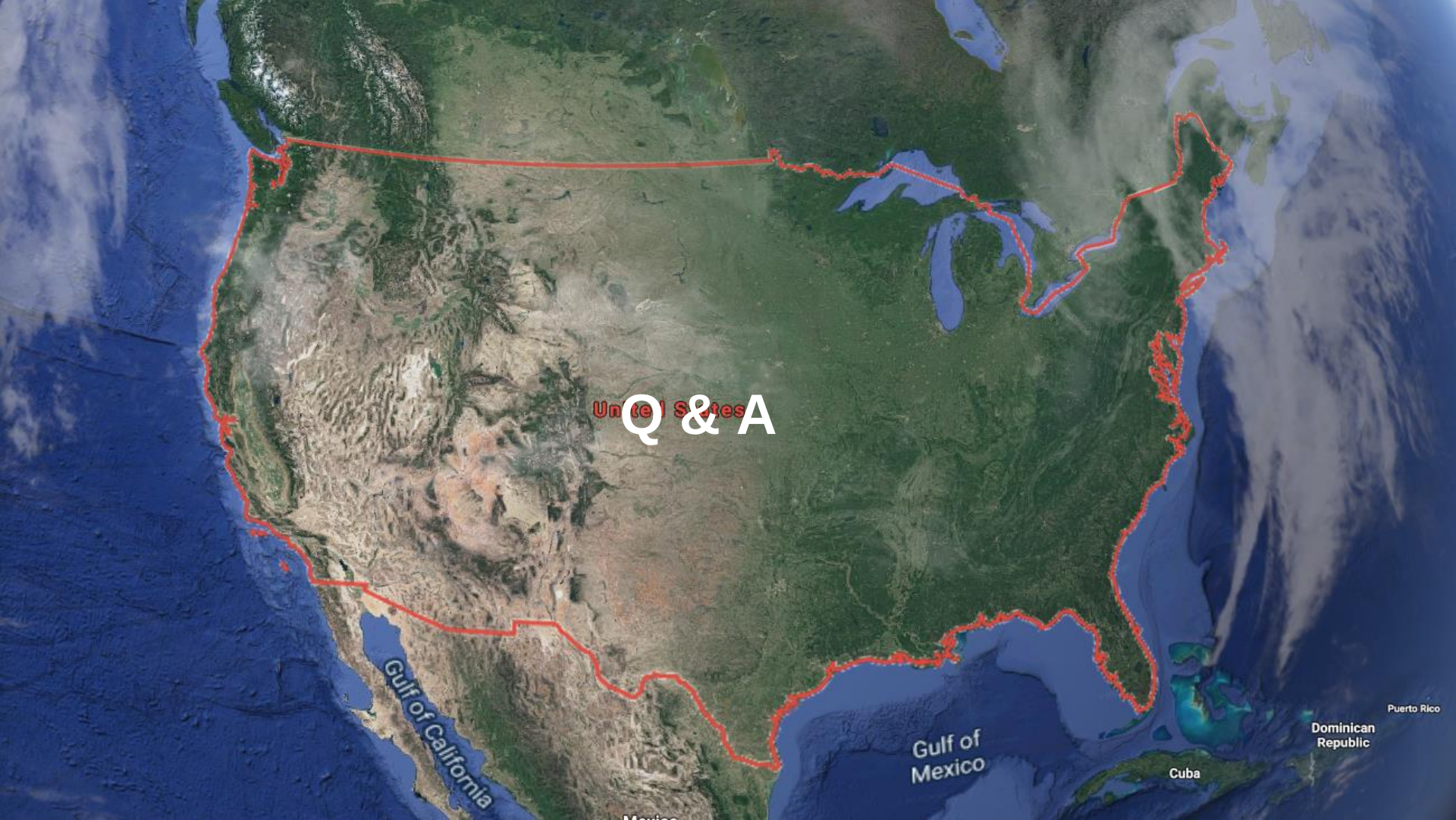
英文能力、表達能力

- 語言中心英文課
- 上台報告、課外活動
- 專業文獻: 原文書paper, 英文維基百科
- 英文融入生活 ex: 英文字幕美劇、YT、英文球評NBA

知道自己想做什麼、能做什麼

- 專題實作
- 企業實習
- 不為考試而學習、不被人情綁架參與活動

選你所愛，愛你所選


Q & A
Gulf of California
Gulf of Mexico
Cuba
Dominican Republic
Puerto Rico