

Teaching Physics in China

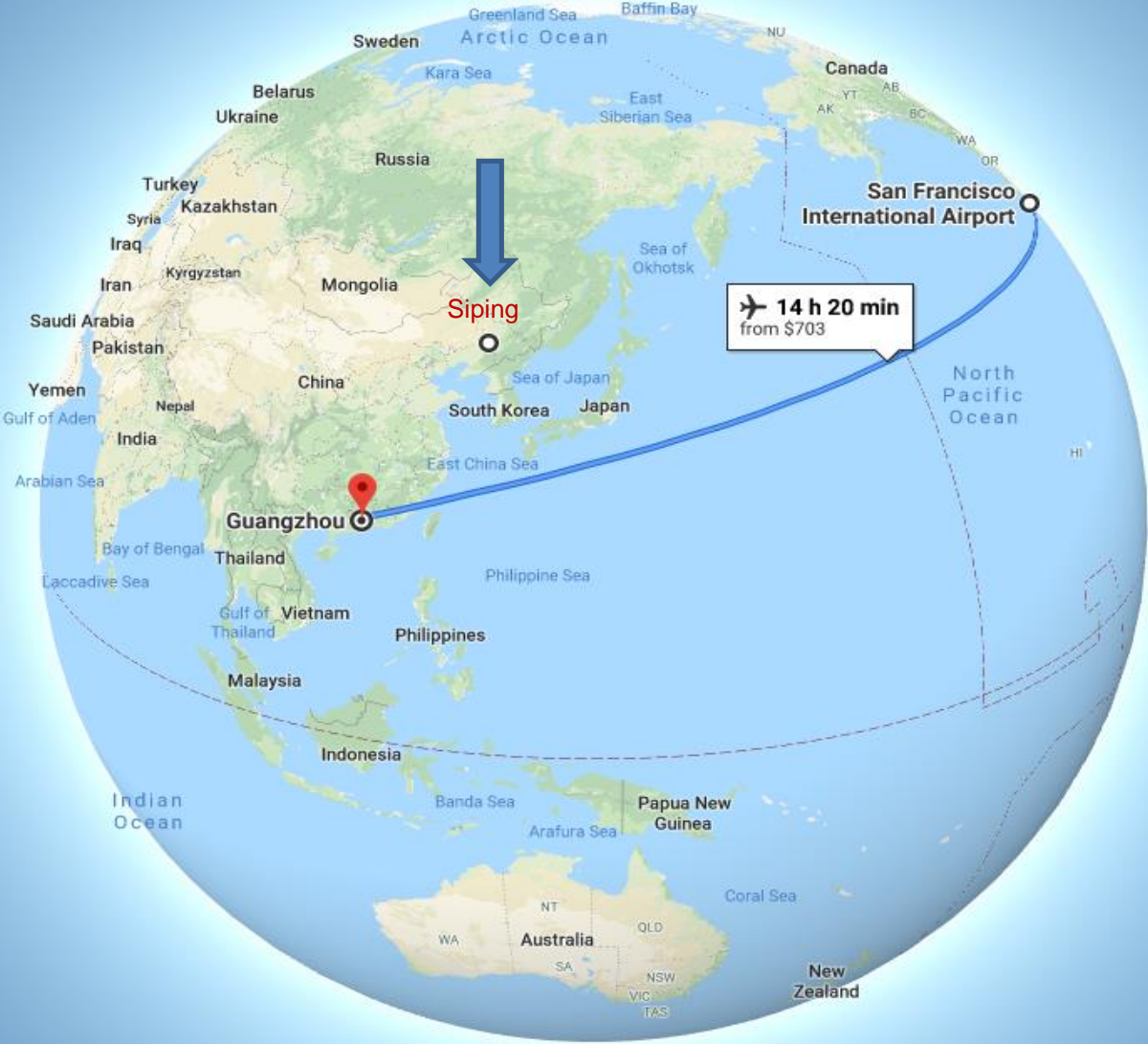
Professor Steven Ball



Depart May 3rd



Destination: Siping, China



Arrive Sunday May 5th



Teach Monday May 6th



Smart Students Like Confucius



Problem: English

(Assume $m_p = 0.025 M_0$)
How massive is a rocket (fully fueled) to get your 3-year supply of food, water, oxygen up into space?
more realistic

2) How expensive is it to place 1kg payload into low Earth orbit?

$$m_p = 21,000 \text{ kg} \leftarrow \text{payload mass}$$

$$M_0 = \frac{m_p}{0.025} = \boxed{}$$

fully fueled rocket mass

3) How expensive is it to get all of your 3-year supplies in low earth orbit? *moral of story - it is hard to get into*

$$= m \frac{dv}{dt} = v_{ex} \frac{dm}{dt}$$

Rocket Thrust

make this large!
chemical-based rockets $\sim 4 \frac{\text{km}}{\text{s}}$

make this large!



Try Demos!



Mission to Mars Theme

linear air resistance $\sim kv$
Drag $\sim Dv^2$

kv
 ϕm
 mg

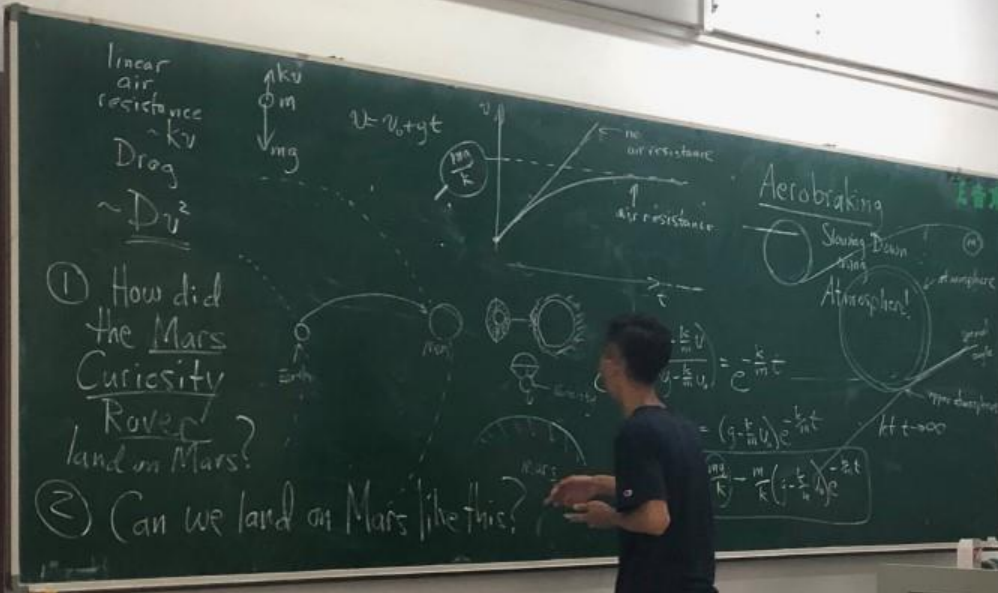
$v = v_0 + gt$

no air resistance
air resistance

Aerobraking
Slowing Down
Atmosphere!

① How did the Mars Curiosity Rover land on Mars?

② Can we land on Mars like this?



The Martians



All the Groups Present in English!

Gravity

$$U = \sqrt{\frac{GM}{r}}$$
$$E = \frac{1}{2}mv^2 - \frac{GMm}{R_E} = 0$$
$$11.2 \frac{\text{km}}{\text{s}} = v_{\text{esc}} = \sqrt{\frac{2GM_E}{R_E}}$$

3 years

How much food? (kg)

How much water?

How much O₂?

Hohmann Transfer

Ellipse

3 year Journey

1.52 AU

8 1/2 months

8 1/2 months

1 AU = 1.5 x 10⁸ m

Kepler's 3rd Law

$$T^2 = \frac{4\pi^2}{GM_S} r^3$$
$$\frac{T^2}{T_M^2} = \frac{r^3}{r_M^3}$$

$T = 2.00$

$T_M = 1.52$

$U_i = 33 \frac{\text{km}}{\text{s}}$

$v_{E1} = 30 \frac{\text{km}}{\text{s}}$

$v_M = 24 \frac{\text{km}}{\text{s}}$

$v_f = 21.5 \frac{\text{km}}{\text{s}}$

$3 \times 365 \times 2 = 2190 \text{ L} = 2190 \text{ kg}$

$3 \times 365 \times 1 = 1095 \text{ kg}$

$2190 \text{ kg} \times 3 = 2190 \text{ kg}$



Overcoming the Language Barrier



LeTourneau Faculty at JLNU: Oscar & Ada, Russell, me, Karen & Greg



Jilin Normal University Campus



Friendship & Food

The Schwartz Family & Rachel



Sports Day



吉林财经大学 第五十二届田径运动会

吉林财经大学
经法学院

Sports Day





Dean Wang's Family



SHOT BY
360 N6

A12

Dean Huang's Family



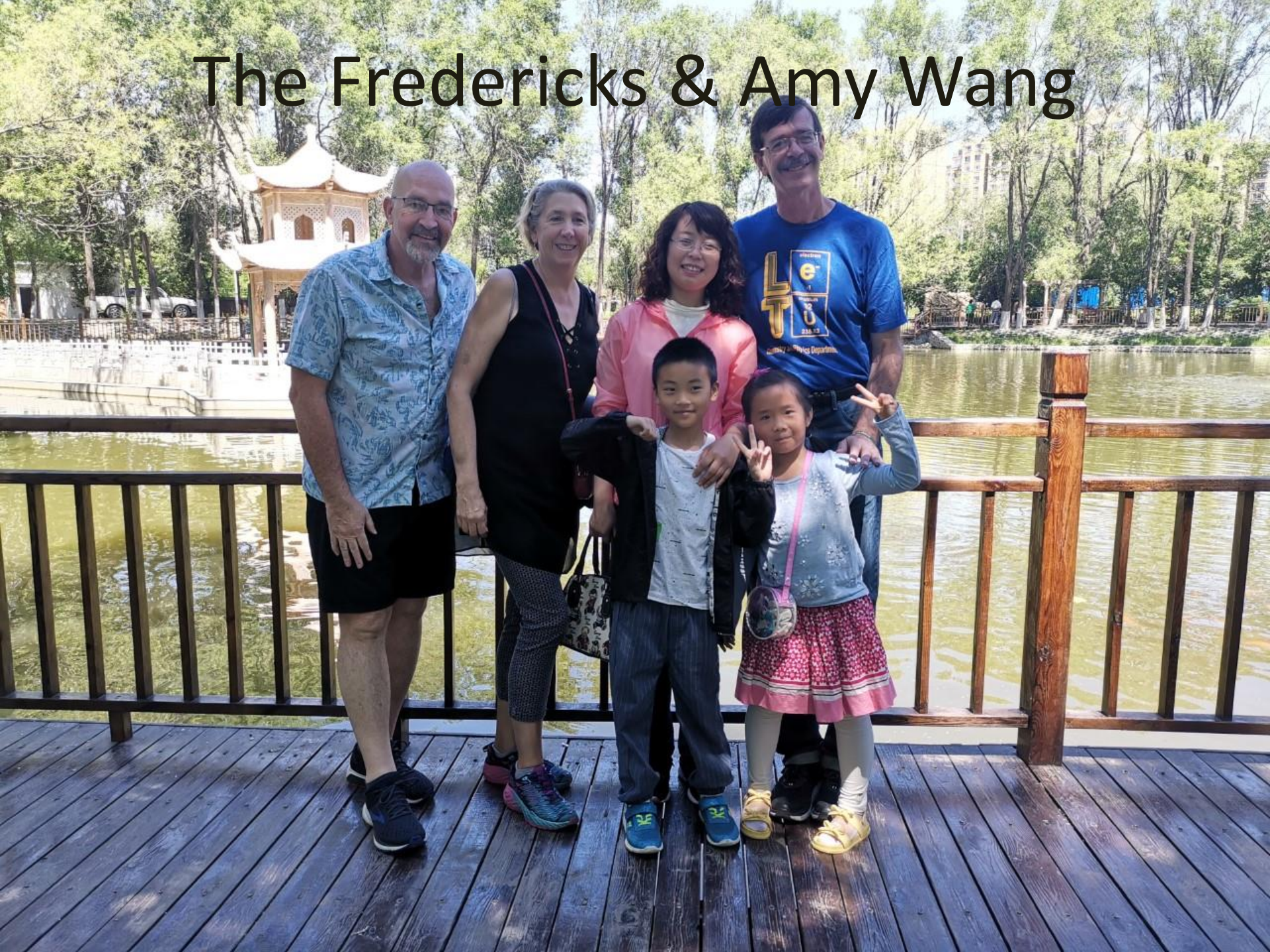
Mona and Friends



Beijing Prepare Girls



The Fredericks & Amy Wang



Friendship & Food



Trying Tai Chi

Harder than it looks!



Traveling in China



Harbin – Russian Influence



Harbin



Shenyang Palace



Shenyang



接站送站入口

Changchun



Changchun Palace



Fengcheng & Dandong



English Institute

英语



不拖欠

欢迎光临

R

Door



Our English Training Center offers American
American English education with our special "Seven Stars Teaching Method".
We have a professional teacher and Chinese teacher who demonstrate good moral values and love for children as well as ability
to teach English language.
Our English training center is open for 10 years old to adult.
We have a variety of American culture activity in the morning center activity.
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SAN FRANCISCO

Yalu River



Korean War Memorial



Dandong Area



Hangzhou – West Lake



Friends During Graduate School: James & Amanda Liu



Shanghai



James, Amanda & Amy Liu



Goodbye China!

