



Legions of Strangers

Autism Spectrum Disabilities and France in the 21st Century

Contents

Preamble	3
Introduction	3
Context	4
Genetics	4
More Genetics	6
In Our Own Work	8
Demographics and Epidemiology	9
Comparable Estimates of Special Needs	11
Before a Student Joins a Class	13
Logistics	15
Internet of Things, Sensors and Smart Garments	19
The Curriculum	20
A Typical class	24
Active Research Topics	35
Appendix A - linguistics	38
Appendix B - urbanization	40
Appendix C – HERON selections	41
Appendix D – SAITO Accounting	47
Appendix E – Tai Chi tools	54

Preamble

Our apologies for writing primarily in English. If there is a professional French editor you could recommend we would be appreciative. Summary statements are in **bold** with **cyan** highlights:

Cover image: A unit of the famed French Foreign Legion on parade.

By tradition, they march at a markedly slower cadence than other French military units. The measure of a warrior is what is achieved when he reaches the battlefield. We explain to our students that, while they do indeed dance for their own health, they also have obligations to their classmates, aides, teachers and families. We emphasize that one is always on camera during class, so from a global perspective a student has to be mindful that somewhere on Planet Earth now or in the future another person – a stranger - with special needs may see the student dancing, borrow some courage and decide that they too could dance like that. The word *legion* comes to English from Latin via Old French: *legere* means 'to choose'. We interpret the responsibility of a member of a legion as to perform his or her duties to help strangers make choices.

Introduction

Two months ago we noted a very disappointing article titled **“'France is 50 years behind': the 'state scandal' of French autism treatment”**

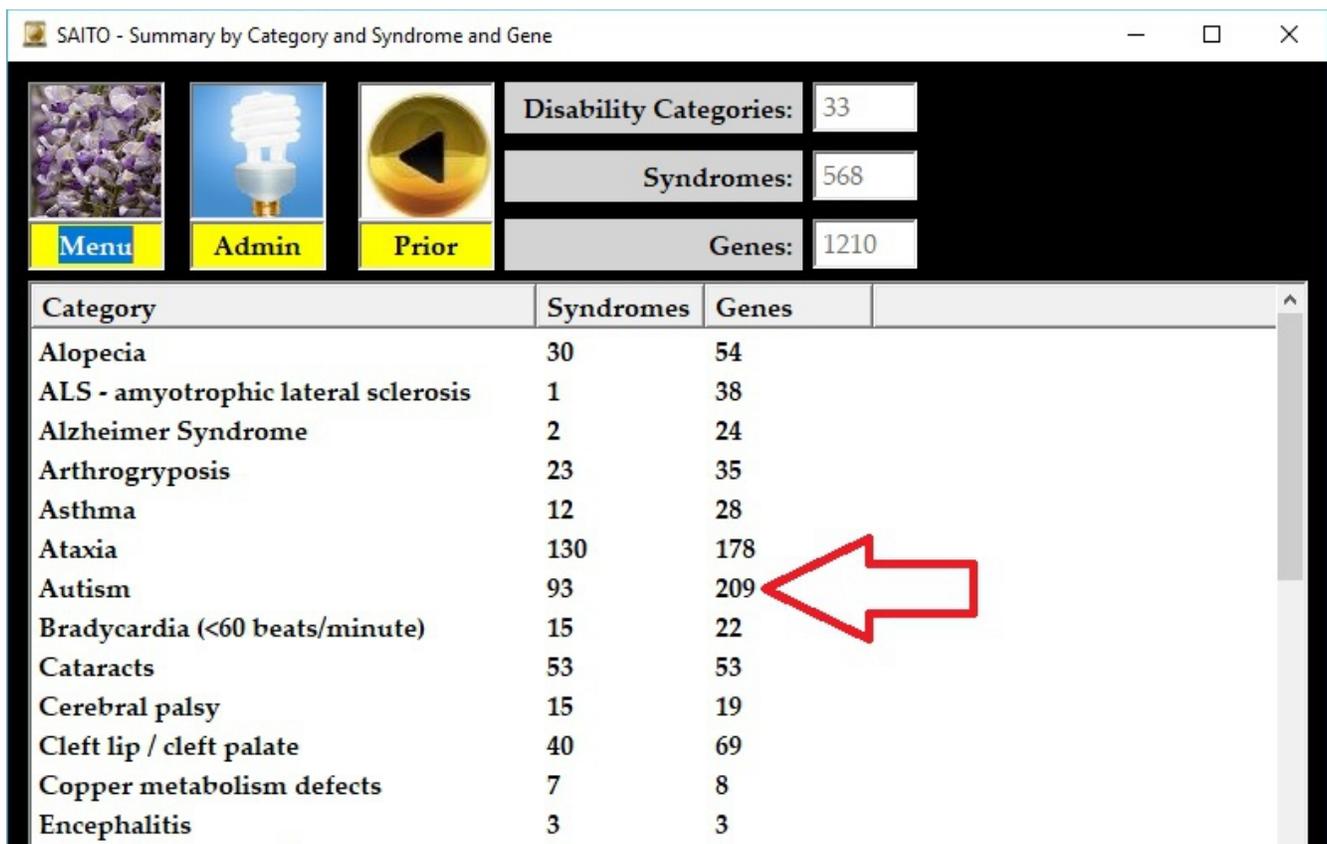
<https://www.theguardian.com/world/2018/feb/08/france-is-50-years-behind-the-state-scandal-of-french-autism-treatment>

If the nation that produced, among others, the esteemed Baron Augustin-Louis Cauchy FRS FRSE (August 21 1789 – May 23 1857) and the distinguished Claude-Louis Navier (February 10 1785 – August 21, 1836) would not mind some advice on autism spectrum disabilities we can summarize our hard-won experiences. As everyone likely knows, both men's names are among the seventy-two inscribed on the Eiffel Tower. The work of both Cauchy and Navier have informed our professional interests for many years so one could interpret this document as partial repayment of a debt.

Context

We teach the venerable Chinese martial art of Tai Chi Chuan to students with special needs - the bulk of the the students are somewhere on the autism spectrum. We are disinclined to exclude those already excluded so there are students with other disability categories: examples would be the arthrogryposis spectrum, the cerebral palsy spectrum, the ataxia spectrum and the Down syndrome spectrum. The students get better physical health, an inclusive social group and life goals in the form of performance-based bachelor's and master's degrees. The core curriculum is what a neurotypical Chinese adult would study at a sports university in China today. Among other things, we make heavy use of sensors (Internet of Things) to try and minimize seizures and provide daily digital scores. The scores can be used by parents and physicians to quantitatively assess whether changes in diet, sleep, medications or logistics are positive - if the Tai Chi scores scores go up the change was probably right. This effort requires a great deal of software so our SAITO application is large.

Genetics



SAITO - Summary by Category and Syndrome and Gene

Disability Categories: 33
Syndromes: 568
Genes: 1210

Category	Syndromes	Genes
Alopecia	30	54
ALS - amyotrophic lateral sclerosis	1	38
Alzheimer Syndrome	2	24
Arthrogryposis	23	35
Asthma	12	28
Ataxia	130	178
Autism	93	209
Bradycardia (<60 beats/minute)	15	22
Cataracts	53	53
Cerebral palsy	15	19
Cleft lip / cleft palate	40	69
Copper metabolism defects	7	8
Encephalitis	3	3

As can be seen in the screenshot above there are currently over 200 genes and nearly 100 named syndromes (red arrow) involved in just the autism spectrum. The genes are scattered across all 23 chromosome pairs and there even a few in mitochondrial DNA. As more surveys are done in Africa, Asia and South America it is likely that the tallies will increase. The situation is, alas, comparable for other spectra, notably ataxia, microcephaly, hypothyroidism and cleft palate/cleft lip. As can be seen, as of yesterday we currently track 33 disability categories with 568 named syndromes and 1210 genes. Usually, all one needs is for one gene to malfunction.

/1/ For France (and everybody else) we assert that the label 'autistic' is so vague as to be meaningless.

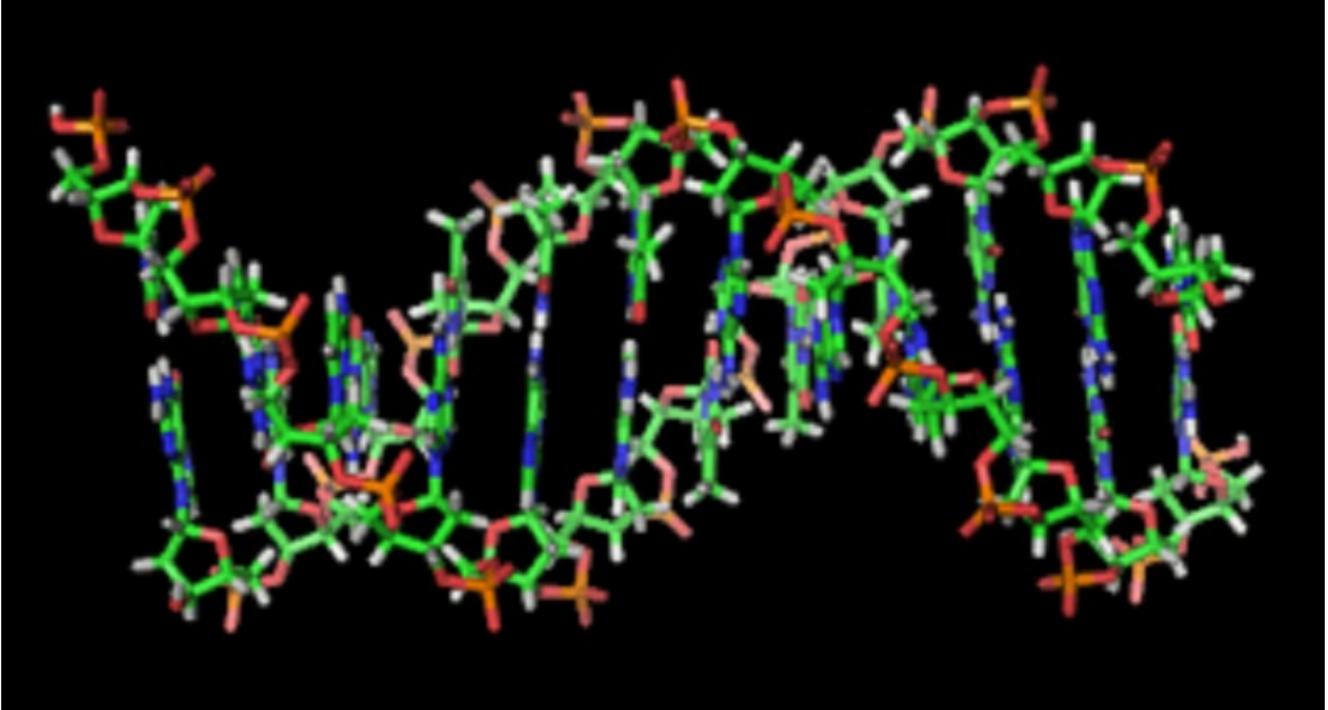
Chromosome	Region	Gene	Syndrome
4	q21.3	AFF1	Fragile XE syndrome
4	q23	EIF4E	Eukaryotic translation error syndrome
4	q27	PRDM5	Autism 18 (AUTS18)
4	q31.1	NAA15	Autism 18 (AUTS18)
5	p12	HCN1	Epileptic encephalopathy early infantile 24 (EIEE24)
5	p13.2	NIPBL	Cornelia de Lange Syndrome
5	p15.3	SLC6A3	Dopamine transmitter deficiency
6	p11	RAB23	Carpenter Syndrome
6	p21.31	UQCC2	Mitochondrial complex III deficiency nuclear 7 (M...
6	p21.32	SYNGAP1	Mental retardation autosomal dominant 05 (MRD5)
6	q12	PHF3	Autism 18 (AUTS18)
6	q25.3	ARID1B	Coffin-Siris syndrome 1
6	q26	PARK2	Autism 18 (AUTS18)
7	p11.2	ZNF713	Zinc Fingers syndrome

Shown above: some of the syndromes and genes arranged by chromosome and region.

More Genetics

It would be fair to characterize the naming of genes and syndromes as somewhat chaotic. In many cases the association of genes with a syndrome is whimsical.

/2/ If France did a great deal of DNA testing and managed to associate residents with syndromes and genes would this be an accurate and actionable diagnosis? The answer is NO. But it would be a beginning.



Shown above: the now-familiar double helix structure of deoxyribonucleic acid (DNA). In round numbers, we humans have about 24,000 genes that code for proteins. This amounts to about 1.5% of our total DNA. DNA encodes these genes usually as a series of four (canonical) nucleotides: adenine, thymine, guanine and cytosine. These are typically abbreviated as ATGC. The nucleotides are interpreted in triplets so a sequence of CCT, for example, is interpreted as the amino acid proline, while GGA is interpreted as the amino acid glycine. The sixty-four ($4 \times 4 \times 4$) possible triplets are interpreted as 20 different amino acids plus start and stop sequences. The DNA to make a protein like insulin or hemoglobin would have a start sequence of ATG followed by lots of amino acid sequences and closed by a stop sequence like TAA.

There are several circumstances of interest:

1. if somewhere in one's DNA for insulin one has CCC instead of CCT proline is still encoded for and all is well.
2. if somewhere in one's DNA for insulin one has CTT instead of CCT leucine is encoded for instead of proline. The consequences here vary – the resulting insulin may still be functional.
3. If the start triplet is not ATG but is something like ATT or ATC or ATA (all of which encode the amino acid isoleucine) then the construction of expected protein will not be started – the results are almost always disastrous.
4. Similarly, if the stop triplet is not TAA, TGA or TAG but is something like TAT or TAC (both of which encode the amino acid tyrosine) the protein will be built, but will be too long. The consequences of this vary – the insulin might still be functional, might not function at all, or might be partially functional. Sometimes a mis-coded stop also causes subsequent genes to be impacted or even ignored.
5. There is symmetry of a sort: if the DNA for insulin should have had TAT or TAC (the amino acid tyrosine) but instead has TAA, TGA or TAG (stop) the resulting protein will be too short. Again, the consequences of this vary, but the situation is not promising.
6. By mechanisms not always understood multiple nucleotides can be deleted – sometimes this involves large regions of a gene. The most common mutation in the cystic fibrosis spectrum is found in the CFTR gene and is known as $\Delta F508$ (where the Δ means delete), and is the loss of three nucleotides typically coding for the amino acid phenylalanine at position 508. The CFTR gene is located in the q31.2 area of chromosome 7 and there are more than 1500 deletions and mutations that are linked to cystic fibrosis. Mutations in the MBL2 gene on chromosome 10 in the q11.2-q21 region have been shown to modify of the effects of CFTR mutations and deletions. **Gregory Lemarcial died of cystic fibrosis in 2007 at the age of 23.** It seems likely the great pianist and composer Frederic Chopin (and his sister) suffered from cystic fibrosis for many years.
7. The opposite of deletions are repetitions. Instead of one CAG triplet (codes for the amino acid glutamine) one might have dozens or hundreds of triplets. Such repeats in the HD gene on chromosome 4 at position q16.3 are implicated in the Huntington's Disease spectrum. Generally, one to 35 CAG repeats are normal (the protein functions correctly) and from 36 repeats to more than 250 repeats will cause Huntington's to manifest. **Currently, it is believed that the incidence**

of the Huntington's spectrum in France is markedly lower than what is encountered in Great Britain or the United States. But much higher than Iceland

8. A more extreme example of repeats are trisomies where, instead of two chromosomes in a pair, one has three. A classic example of this is Down syndrome which involves chromosome 21. Down syndrome is yet another spectrum – one may have a complete or partial third copy and portions of chromosome 21 may be found attached to other chromosomes – known as a mosaic translocation. Charles DeGaulle's daughter Anne had Down syndrome

Un enfant pas comme les autres



<http://fondation-anne-de-gaulle.org/>

In Our Own Work

Two nominally similar students both had DNA tests that identified an abnormal ADNP gene on chromosome 20 in the q13.13 regions. We had been made aware of the publication

Helsmoortel C, Vulto-van Silfhout AT, Coe BP, Vandeweyer G, Rooms L, van den Ende J, Schuurs-Hoeijmakers JH, Marcelis CL, Willemsen MH, Vissers LE, Yntema HG, Bakshi M, Wilson M, Witherspoon KT, Malmgren H, Nordgren A, Annerén G, Fichera

M, Bosco P, Romano C, de Vries BB, Kleefstra T, Kooy RF, Eichler EE, Van der Aa N (2014). "A SWI/SNF-related autism syndrome caused by de novo mutations in ADNP". *Nature Genetics*. 46 (4): 380–4. doi:10.1038/ng.2899. PMC 3990853 . PMID 24531329.

Thankfully, the syndrome was named Helsmoortel-Van der Aa. It was clear that the two students had dramatically different velocities of learning. We calculate velocity of learning as an aggregate of daily scores in each of the various Tai Chi routines – somewhat like the Dow-Jones or Standard and Poor's 500 stock indexes.

/3/ It mattered significantly which mutation of ADNP a student had, so the proper diagnosis has to be at the gene/nucleotide level. That is the answer to the question on page 5.

Demographics and Epidemiology

We have worked for many years tracking vicious diseases like Ebola and AIDS. Aggregated approximations for the disability categories we find of interest are shown the column labeled Special Needs by second level French political subdivision.

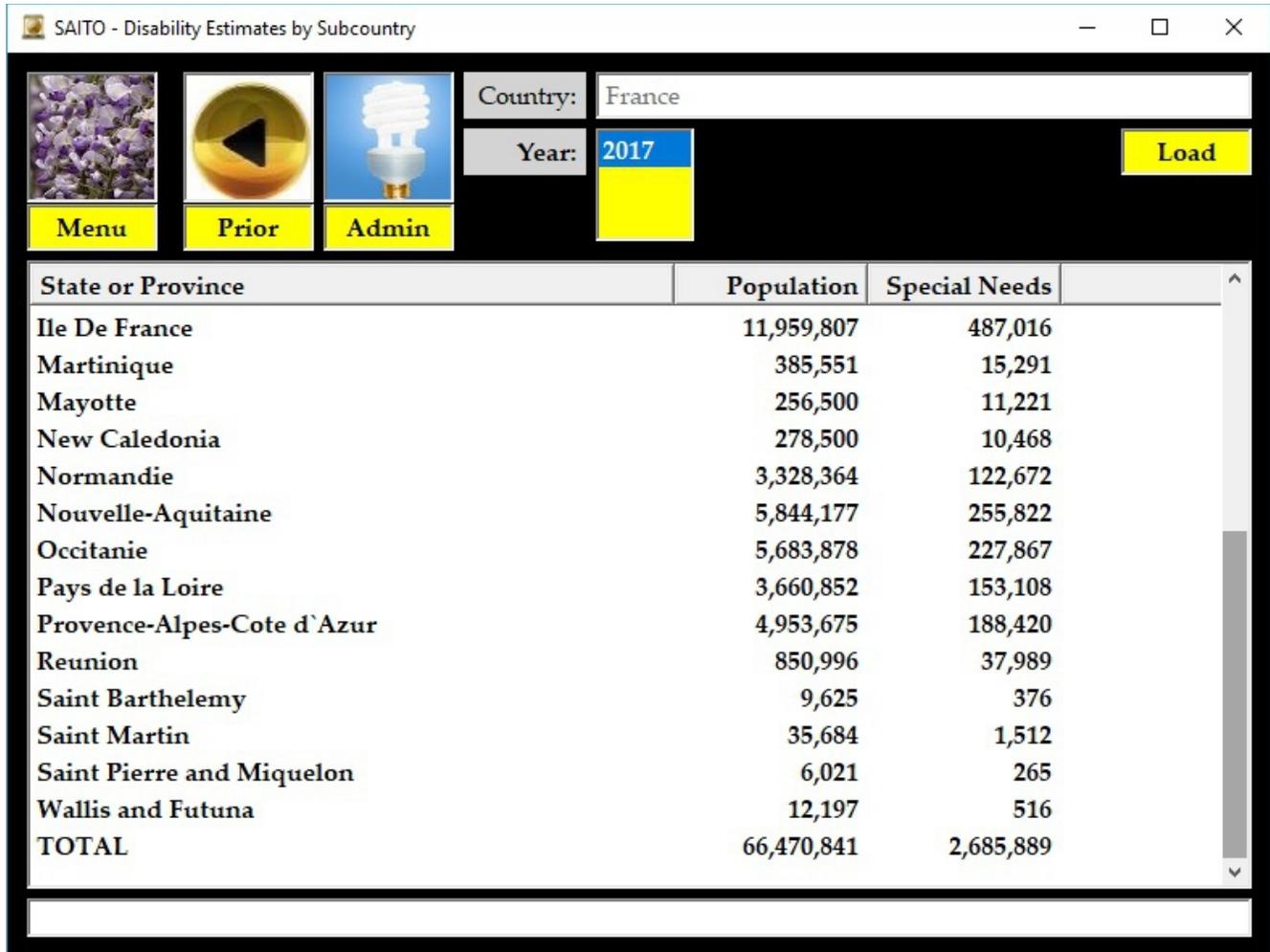
SAITO - Disability Estimates by Subcountry

Country: France
Year: 2017
Load

Menu Prior Admin

State or Province	Population	Special Needs
Auvergne-Rhone-Alpes	7,757,595	333,299
Bourgogne-Franche-Comte	2,819,783	106,987
Bretagne	3,258,707	125,942
Centre-Val de Loire	2,570,548	92,449
Clipperton Island	0	0
Corsica	320,208	12,413
French Guiana	259,865	11,321
French Polynesia	275,918	10,177
Grand Est	5,552,388	243,950
Guadeloupe	402,119	15,877
Hauts-de-France	5,987,883	220,931

(continued)



State or Province	Population	Special Needs
Ile De France	11,959,807	487,016
Martinique	385,551	15,291
Mayotte	256,500	11,221
New Caledonia	278,500	10,468
Normandie	3,328,364	122,672
Nouvelle-Aquitaine	5,844,177	255,822
Occitanie	5,683,878	227,867
Pays de la Loire	3,660,852	153,108
Provence-Alpes-Cote d`Azur	4,953,675	188,420
Reunion	850,996	37,989
Saint Barthelemy	9,625	376
Saint Martin	35,684	1,512
Saint Pierre and Miquelon	6,021	265
Wallis and Futuna	12,197	516
TOTAL	66,470,841	2,685,889

/4/ While France is very special, especially to the French people, an incidence of about 4% (FOUR PERCENT) for the disabilities that interest us is quite typical. We would expect that estimates of 500,000 French people with autism spectrum disabilities are off by a factor of at least THREE.

Noted statistical theoretician Ioseb Jughashvili is alleged to have said, "A single death is a tragedy; a million deaths is a statistic." He may have borrowed this from a 1932 essay on French humor by German journalist and editor Kurt Tucholsky (January 9 1890 – December 21 1935). Jughashvili, better known as Joseph Vissarionovich Stalin (December 18, 1878 – March 5, 1953), was incorrect: one or two million more people is more than a statistic – especially if one of them is in your family.

Comparable Estimates of Special Needs

Bearing in mind that populations change – often by the second – and that there are exceptional densities – like Huntington's Disease in parts of Venezuela near Maracaibo – here are some estimates for comparison purposes

Country	Population	Special Needs	Gross Domestic Product (*)
China	1,340,263,917	55,334,222	\$23,120,000,000,000
United States	329,433,163	13,131,190	\$19,360,000,000,000
Mexico	119,530,753	4,887,423	\$2,406,000,000,000
France	66,470,841	2,685,889	\$2,826,000,000,000
Canada	36,964,124	1,537,076	\$1,764,000,000,000

- = purchasing power parity; in US dollars

One way to measure the strength of a country or a society is how it treats its weakest – the old, the very young, the poor and the disabled. France has a huge number of advantages:

1. Nearly universal literacy AND women have access to higher education so the nation is not using just half of its brains.
2. Nearly universal ability to speak and understand spoken French (see Appendix A) – unless, of course, one is autistic and has an expressive language disability
3. Nearly everyone can write, and a standard alphabet is in use
4. France is not engaged in a civil war nor in an intense foreign war
5. France has superior mass transit and infrastructure
6. For the most part, religion is not a major source of social tension
7. France is urbanized – about 80% of French live in urban areas
8. France averages about 3 physicians per 1000 residents. This is below average for Europe, and France would be in serious danger were an epidemic (likely a viral hemorrhagic fever) to erupt. We are informed there are about 250 medical geneticists in France. This is far too few and should be cause for concern.
9. Nearly universal access to clean water and sanitation
10. Inflation is 1,2% - it was 0.3% in 2016 – that is a consequence of the Euro

And some disadvantages

1. the estimated size of the French deaf population is 3,750,000 which is higher than one might expect. We must again disagree with Joseph Stalin - nearly four million people unable to hear Debussy is a tragedy. Estimates vary between 100,000 and 170,000 people use French Sign Language. These numbers appear to be too low by more than an order of magnitude. It is not uncommon in the United States for autistic spectrum individuals to sign.
2. Unemployment in 2017 was 9.5% - this is too high
3. About 14% of the population lives below the poverty line
4. The government (like many) has greater expenditures than revenues: \$1,412 billion versus \$1,334 billion
5. While exports rose from \$507 billion to \$541 billion imports also rose to \$576 billion from \$537 billion which means the balance of trade increased from -\$30 billion to -\$35 billion.
6. Reserves of foreign currencies and gold increased from \$138 billion to \$147 billion. This was eclipsed by external debt increasing from \$5,250 billion to \$5,360 billion.
7. Blindness has given way to the term vision-challenged. There are a bewildering collection of disparate causes for being unable to see including macular degeneration, diabetes, cataracts (second most common surgery in France after childbirth) and glaucoma. The current French definition asserts about 3,500,000 people are vision-challenged: 150,000 are blind; 350,000 have profound impairment; 1,000,000 have moderate impairment and another 1,000,000 are in transition between moderate and profound.

/5/ One hardly need be Pierre-Simon Marquis de Laplace (March 23 1749 – March 5 1827) to calculate that because of its advantages, and despite its disadvantages, France ought to be setting an example for many other nations. Certainly, one may say that as concerns autism spectrum disabilities in particular and special needs in general France is not fulfilling its planetary leadership obligations.

Augustin-Louis Cauchy was notoriously impatient with people who only caused (or proposed) problems as opposed to people who solved them. Nor was Cauchy sparing of people who did not completely solve problems. In the spirit of his rumored last words "*les hommes passent mais leurs actes demeurent*" a plan:

Before A Student Joins a Class

The following comments reflect our experiences in America – we would be grateful for any observations about differences in France.

1. There are three teaching modes: [A] some students follow our internet lessons and we never hear from them [B] Other students follow the internet lessons at home and periodically film their progress. They send in videos, and, for a nominal fee, we send back grades [C] students attend a physical class – we prefer **at least five days per week (seven if they can) two hours per day**.
2. If a family is interested in having a family member attend class we ask that at least the parents and child sit through one of our classes. If there are serious scheduling problems we can accommodate a parent watching videos of a class.
3. If there is still interest we have a series of tasks that include [A] teaching bowing and saluting, [B] showing how to use biometric fingertip readers to sign in and



- out [C] showing some of the hand gestures (sign language) students use to ask for water, a snack, a break and so on. For students who prefer PECS cards we support those as well [D] measuring for clothing and shoes.
4. We ask parents to schedule a DNA test if they have not already. This is not mandatory, but it is strongly advised. Parents can get the test done but not share the results if they so choose.
 5. We require a physician's contact information and there are some specific medical questions we must ask – these have to do with seizures, allergies, tachycardia and overheating
 6. We schedule an examination by a doctor of Traditional Chinese Medicine. The results of this are used to shape an individual homework assignment. These are

usually isolated movements from Tai Chi Chuan sets, Qigong sets or Tai Chi tool exercises.

7. If the child is less than 22 years old we contact the special education coordinator for the school district responsible for the child.
8. We also must contact the staff member from the social services agency. We regret to report that these agencies have a bewildering number of different versions depending on the geographical location. In some American states the agency is part of city government or county government or state government. Sometimes the agency is a private business. California has 39 million people in 58 counties but has divided the state into 22 regional centers whose boundaries are unique. We do not admire this chaos.
9. One school age child in seven in America has an Individual Education Plan (IEP). These are formal contracts between the family and the school district defining what is to be taught. Usually there is a social service agency staff member included. We have to add text to the plan defining our teaching. There may be other third parties involved.
10. For individuals who are older than 21 years or who have left school the IEP is replaced by an Individual Behavior Plan (IBP). The key difference is school districts are usually not involved.
11. Per US Federal law, parents or guardians and sometimes students or even siblings have to provide **informed consent**. We have to explain the benefits and any risks. We must make everyone aware that they can stop any time. We discuss snacks, emergency procedures, our expectations for homework, how scores are reported and how exciting it is to attend our formal exhibitions.
12. Students are transported in a variety of ways – school buses, vans, private autos and even public transportation. We have to document these arrangements and explain our rather stringent policies about leaving class early or with strangers.
13. If parents are interested we give them a copy of our HERON software. It tracks medications, behaviors, food preparation and consumption, sleep and logistics. HERON data is fed into our SAITO software. Some sample screenshots from HERON are collected in Appendix C – all in English, sadly.
14. We are very reluctant to exclude students. If someone shows up, can walk and wants to learn, we will finesse the rest. Truth be told, we learn more from teaching what are termed extreme students. We are not sure what Pierre Viscount Camborne (26 December 1770 – 29 January 1842) or Claude-Etienne

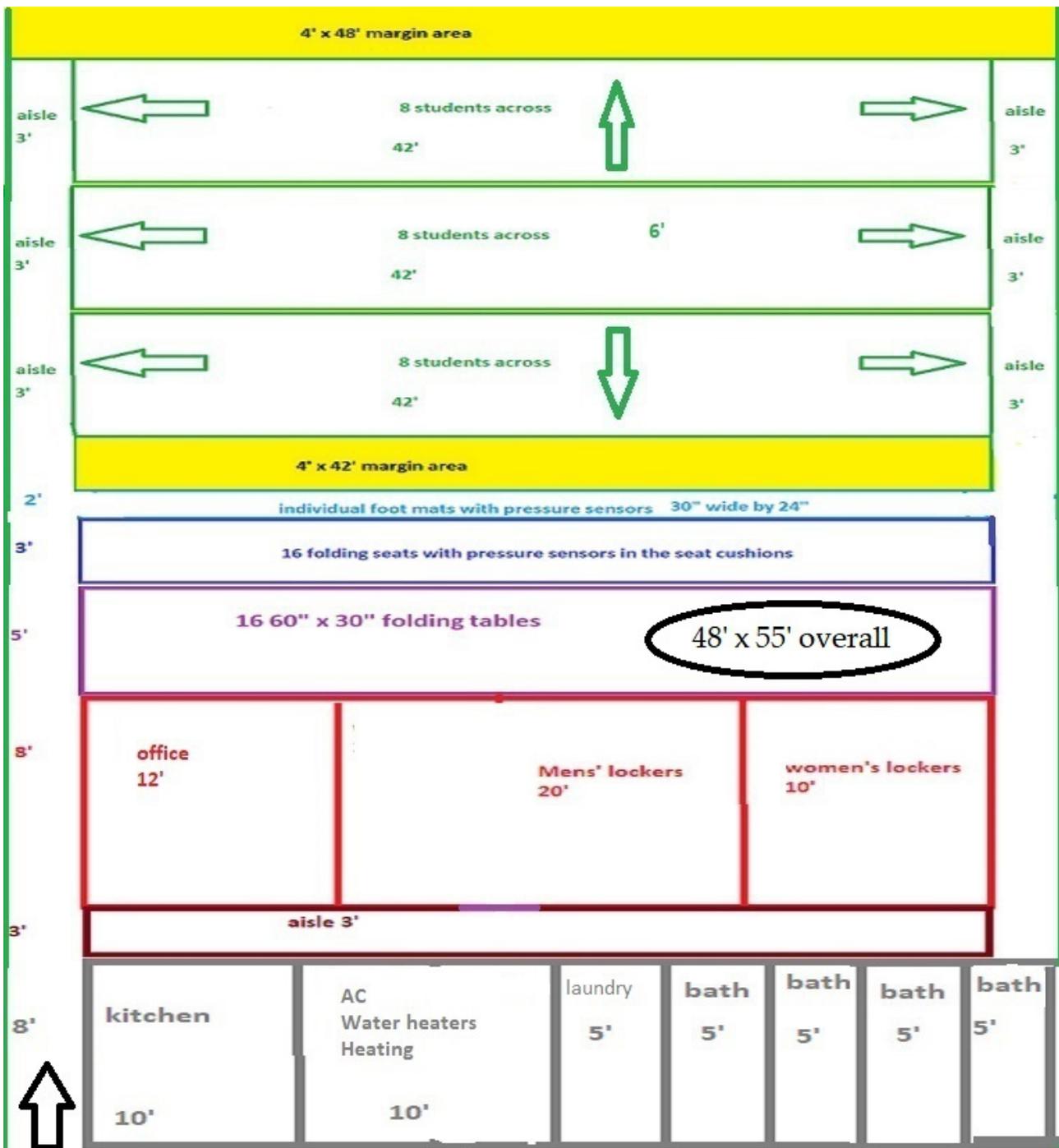
Michel. said at Waterloo, but we appreciate the spirit of "*La Garde meurt et ne se rend pas !*"



LOGISTICS

There are three possible arrangements: [A] a two hour class once per day for five to seven (preferred) days per week [B] what is called adult day care – two two hour classes (so four hours per day) per day bracketed around food preparation, lunch and calligraphy for five to seven (preferred) days per week [C] residential communities where students can participate in the adult day care schedule; can eat three (or more) meals per day; can sleep zero to seven nights; can get dental and medical services; can participate in escorted shopping and so on.

A floor plan for a 275 square meters (48 feet wide by 55 feet long = 2640 square feet) training facility



Note that long weapons like staff, long pole (3 meters), kwan dao (halberd) and spear are frequently practiced outdoors unless there are high ceilings and a lot of space. We have e-written to several colleagues currently teaching Tai Chi Chuan in France (Alsace and Paris to start) to ask about rental, leasing and construction costs. We are entranced by the possibility of modular construction reducing costs and variance.

In a similar manner we currently have no estimates for the cost of electricity, internet access, water, sewage, natural gas, telephone or other utilities.

Generally, in the United States the real estate (building and land) are subject to local property tax – typically assessed by a county and sometimes by a city. The building and land are not subject to state and Federal taxes unless sold.

Most municipalities require that such a facility have at least two blue-colored handicapped parking spaces (see below) and four other parking spaces available.



We have e-written to several colleagues currently teaching Tai Chi Chuan in France to further ask what a recommended salary and benefits for a teacher would be. Of interest is an arrangement where the teacher and his or her family live in or next to the school. Our American experience suggests that at least one assistant teacher (training to become a head teacher) is very useful in a classroom. In the United States typically school districts supply aides who are with the student for the entire school day. Where

the facility is providing adult day care we would expect to hire aides. We are **not** comfortable with paying minimum wage and restricting hours to avoid paying medical insurance. US Federal minimum wage is \$7.25 per hour. Many states have higher standards: Washington \$11.50; California \$11.00; Arizona and Vermont \$10.50; New York \$10.40; Colorado \$10.20; and Hawaii and Rhode Island \$10.10. Currently, the minimum gross wage in France is €9.76 per hour or about \$12 per hour.

In the United States even small businesses are obligated to use payroll software which can print checks and make direct deposits. Typically, various local, state and Federal taxes are withheld from each paycheck. We would expect tasks like

1. French articles of incorporation would have to be provided (*)
2. registration with the French Patent and Trademark Office would follow
3. adequate share capital would be deposited in a bank account
4. an incorporation notice would be published in the official journal.
5. documentation of all those steps must be filed with the Centre de Formalites des Enterprise
6. company books stamped at the clerk of the Commercial Court
7. we have no idea what (if any) collective bargaining agreements might cover teachers or aides
8. employment contracts that are in French and specify pay raises for proficiency in separate sections of the curriculum
9. as will be seen we think teaching 363 days per year (skipping Easter and Christmas) is best for students. Our SAITO software supports a calendar of holidays.
10. As with doing business in the United States we would budget about 50% of employee salaries to be paid as employer taxes and benefits
11. Our project and general ledgers are bolted into our SAITO application software. We give some examples in Appendix D
12. In the United States we typically bill either a school district (which bills a social services agent and ultimately the state) or we directly bill a social services agency. **Parents and students do not pay anything.** Typically, the costs are \$200 per month for a minimum of 40 hours (20 120 minute classes). Students are encouraged to attend 20 additional hours (10 more days) – this is free. We absorb the cost of seminars by grandmasters. Students and families also are

provided \$50 per month by the school district or social services agency to pay for clothing, weapons and related expenses.

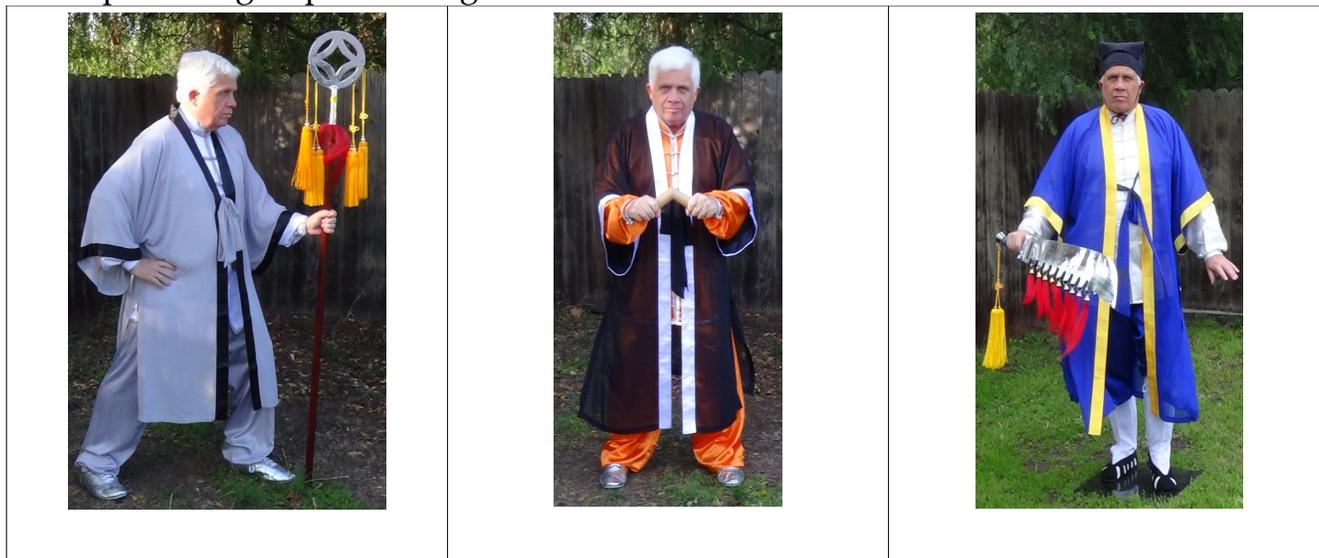
- = whether separate schools operate as franchises or autonomously would have to be determined. It might well even be that they are public as opposed to private

Internet of Things, Sensors and Smart Garments

We use six types of sensors:

1. biometrics – fingertip scanners are used to confirm attendance – both entries and exits
2. accelerometer - recent communications with researchers at Brigham and Women's Hospital (affiliated with Harvard Medical School) have convinced us that measuring head sway during sitting and standing meditation is a good practice. While the accelerometer itself should not be a problem, whether most or all students will briefly tolerate a cap or visor remains to be seen.
3. wrist-based bio-sensors – given the prevalence of seizures, tachycardia and overheating we are hopeful that smart watches that do not tell time will be tolerated by students. Currently, the best (and perhaps only) location for sensors reporting blood pressure, heart beat and temperature is the wrist. An accurate and non-invasive blood glucose sensor may be available in the future.
4. foot pressure – specifically useful for students with ataxia and some versions of arthrogryposis, and likely useful for all students as a measurement of balance. These pressure sensors would be located under a mat placed on the floor near the individual student's chair
5. seat (hip) pressure - specifically useful for students with ataxia and likely useful for all students as a measurement of balance. These pressure sensors would be located under a mat placed on the seat of the individual student's chair.
6. Location (x y z coordinate) sensors in a garment – for centuries martial arts teachers and students in the various Taoist traditions, typically associated with the Wudang Mountains of China, have worn a garment known as a pi sha (examples shown below). As these garments are by design light and flowing we have high expectations that students will like them.
7. Currently, the various sensors transmit data several times per second to one or more hubs which are small computers somewhat similar to an iPad. Hubs send

data to one or more servers which are, in our case, computers with more processing power and access to multiple displays. At various times during the class the different sensors would be reporting data to hubs: biometrics during sign-in and sign-out; head sway and foot/hip pressure during sitting and standing; bio-sensors all class long and location sensors when students are practicing or performing.



The Curriculum

In many cultures and countries exercise routines are taught to encourage individual physical health. It is frequently the case that those routines and their extensions are useful for self-defense and for military training. That was certainly the case in China where, for thousands of years, hundreds or even thousands of martial arts have been used for such purposes, and many of the techniques and technologies also provided physical fitness for civilians, clergy and seniors. Virtually all of the Chinese martial arts have canonical sequences of movements known as sets or forms. It is very common for there to be variations in the sets or in their contents that are collectively known as a style, and these styles usually are named after a location such as Hebei Province or a founder's family name.

In the martial art of Tai Chi Chuan there are six major styles – mostly named after a founding family. By all accounts, the oldest style is that of the Chen family of Wen County in Henan Province in China, so our curriculum resembles what a neurotypical collegiate athlete concentrating in Chen Family style would study at a university in

China.

The constraints imposed were (1) performance-based (2) at least fourteen distinct sets all with international judging standards (3) digital lesson notes for each movement in each set (4) explicitly approved by an authorized international organization and (5) all teaching done at the master level.

Constraint 1 was interpreted as students would be filmed and graded on a daily bases with weekly or bi-weekly films to be sent to external reviewers. Those reviewers would not know that the students have disabilities. After some discussion it was agreed that not all students would be required to perform publicly in formal silks, but that such participation would be encouraged.

The Bachelor's degree (B.A.) curriculum for Chen Family style includes:

1. bowing and saluting; seated Wuji style meditation, standing Wuji style meditation; traditional Chen family warm-up exercises; and additional exercises known as silk reeling
2. unarmed sets: 18 Movements, Lao Jia (= Old Frame, the signature set) and Cannon Fist
3. weapons sets: double batons, single saber, single sword, and staff (eyebrow height). Were one to search the internet for Chen Zhenglei Youtube Lao Jia, for example, it is possible to see a grandmaster's performance of these sets.
4. tai chi tools: ball, bar and ruler (see Appendix E for images)
5. Qigong sets (compiled by the Chinese Health Qigong Association): Ba Duan Jin (Eight Brocades); Yi Jin Jing (Tendon Washing); Wu Qin Xi (Five Animals Exercises); Liu Zi Jue (Six Sounds Breathing Exercises)

The Master's degree (M.A.) curriculum for Chen Family style includes:

6. unarmed sets: Xin Jia (New Frame) and New Frame Cannon Fist, Xiao Jia 108 (small frame – 108 movements; probably the ancestor of Lao Jia)
7. weapons sets: spear, double sabers, double swords, halberd, long (3 meters) pole
8. tai chi tools: bang, bent bang and long bang (see Appendix E for images)
9. Qigong sets: Da Wu (Joint flexion); Twelve Step Daoyin (Health preservation); Shi Er Duan Jin Yin (advanced sitting exercises); Taiji Yangsheng Zhang (a

zhang is a wooden stick 48 inches long) and Mawangdui Daoyin Shu (therapeutic stretching).

[A] Decisions about the curricula took more than two years and tens of thousands of emails between martial arts experts and medical specialists primarily located in Canada, China, Ireland, Peru, the United Kingdom and the United States. It is not unlikely that further discussions will be needed as the types of students encountered increases.

[B] Punching and kicking make up about ten percent (10%) of what is taught in martial arts. The other 90% is recognizing courage and being courageous. Fortunately, the Old Guard was and Foreign Legion, among others, is in courage business.

[C] These two curricula have been approved by the degree-granting university in the United States and by, in this case, Grandmaster Chen Zhenglei.

[D] A neurotypical Chinese university student would likely include a course in Tuishou, a form of light sparring sometimes known as 'pushing hands'. Generally, proficiency there is judged by tournament results. There was widespread agreement that such a course would be a very poor selection for the intended special needs students.

[E] Likewise, a neurotypical Chinese university student might prefer a set known as Fajin 42 to Xiao Jin 108. Fajin 42 is rarely taught – at this writing only by Grandmaster Zhu Tiancai and then only very few times in decades. There are no judging standards. The current consensus is that either of the Competition 42 and Competition 56 movement forms can be reluctantly substituted for Xiao Jin 108 even though both the competition forms are synthetic hybrids that include movements from Sun, Wu, Yang and Chen styles.

[F] A bachelor's degree curriculum for Yang style Tai Chi Chuan was constructed and approved. There are not enough courses to justify a master's degree. There is currently no intention to teach the Yang style curriculum.

[G] It may be possible to construct a bachelor's degree curriculum for one or more of the Sun and Wu and Zhaobao styles Tai Chi Chuan. There are not enough courses to

justify a master's degree. There is currently no intention to teach those styles.

[H] A bachelor's degree curriculum for Hebei style Xing Yi Chuan was constructed and tentatively approved. There are not enough courses to justify a master's degree. There currently is no acknowledged international organization for the style and there is no intention to teach the Hebei style Xing Yi Chuan curriculum. It is currently challenging to construct a bachelor's degree curriculum for the Dai, Shang or Shanxi styles of Xing Yi Chuan.

[I] A bachelor's degree curriculum for Cheng style Bagua Zhang was constructed and approved. There are not enough courses to justify a master's degree. Due to an inordinate fondness for the unique weapons of this style, it is very likely Bagua Zhang sets will be taught as weekend seminars, but there is currently no intention to teach the Cheng style Bagua Zhang curriculum.

[J] For the most part, many of the great external arts such as Northern Shaolin and Hung Gar are so rich in material that curricula for a master's degree could easily be built. Aside from a very few exceptional individuals, these arts are not good choices for special needs students.

[K] Our website www.silverwolfwushu.com has sprawled to over sixteen hundred pages and has a link to our blog

[L] there are links to quite a few videos on the website. A recent video can be seen at <https://www.youtube.com/watch?v=BPUyCBhqAFo>

A Typical Day

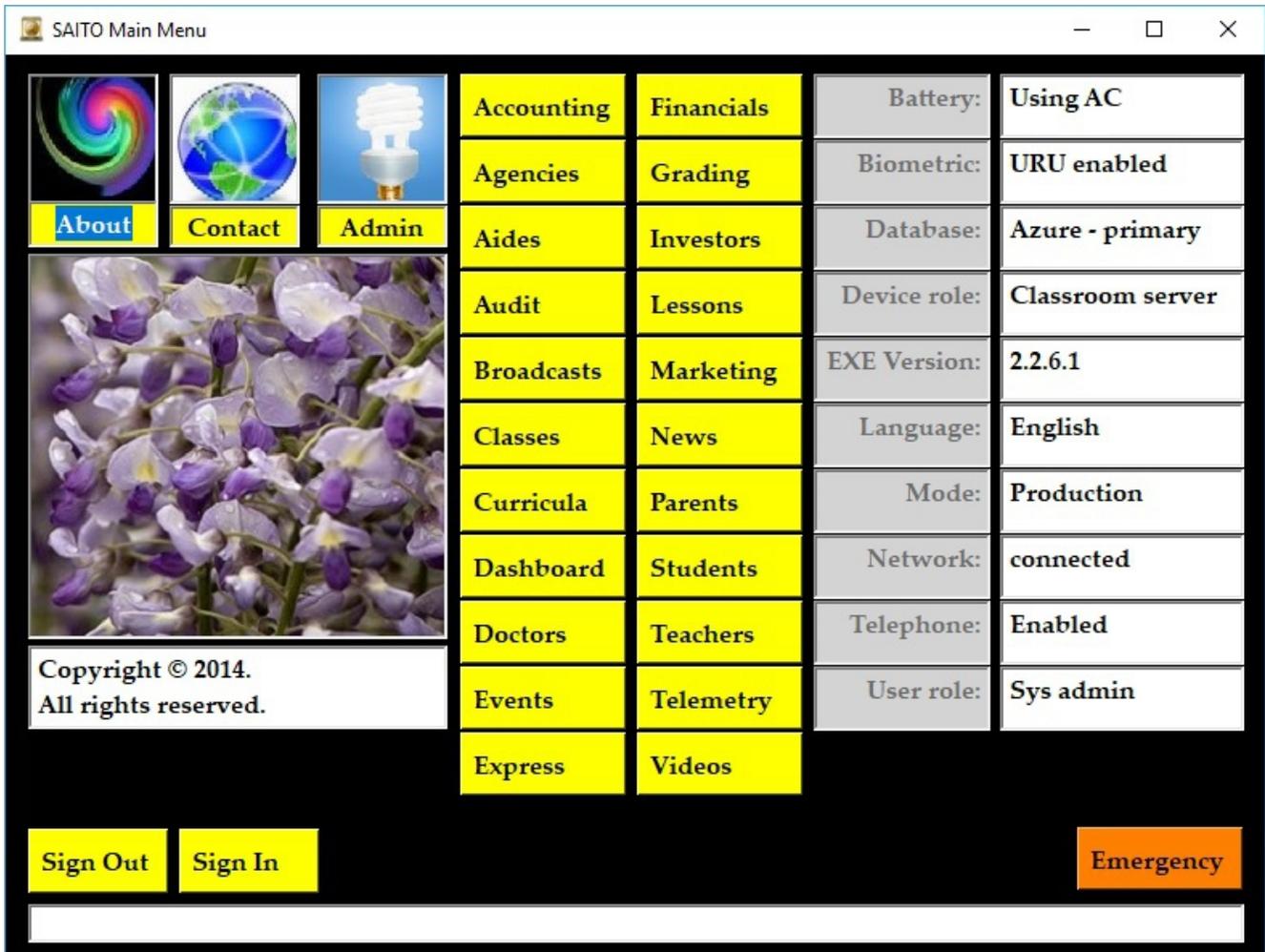
The course of study centers on Chen Family style Tai Chi Chuan as taught by Grandmaster Chen Zhenglei. He is a member of the 19th (**nineteenth**) generation to teach this style. Were an instructor to prefer Grandmaster Chen Xiaowang, Grandmaster Zhu Tiancai or Grandmaster Wang Xian very little would change in the curriculum – the references videos the students would see and use would be different. We film and grade all classes. One day per week the class dresses in traditional semi-formal black cotton outfits (below left) and **with consent** the films are sent to an outside expert to be graded.



About once a month or whenever an honored guest visits the class will dress in formal silks, with colors and patterns chosen by the class (an example above right), and perform as a team in series. It is typical to also perform at annual International Tai Chi Day events and at martial arts congresses and tournaments.

Besides frequent teaching visits from members of the Chen Family we invite guest instructors drawn from experts in Chen style, the six other other styles of tai chi, and even other martial arts. We will assume **none** of those exciting variations in apparel and schedule are happening in the activities discussed below. Our schedule is three classes at 9:00, 11:15 and 13:30.

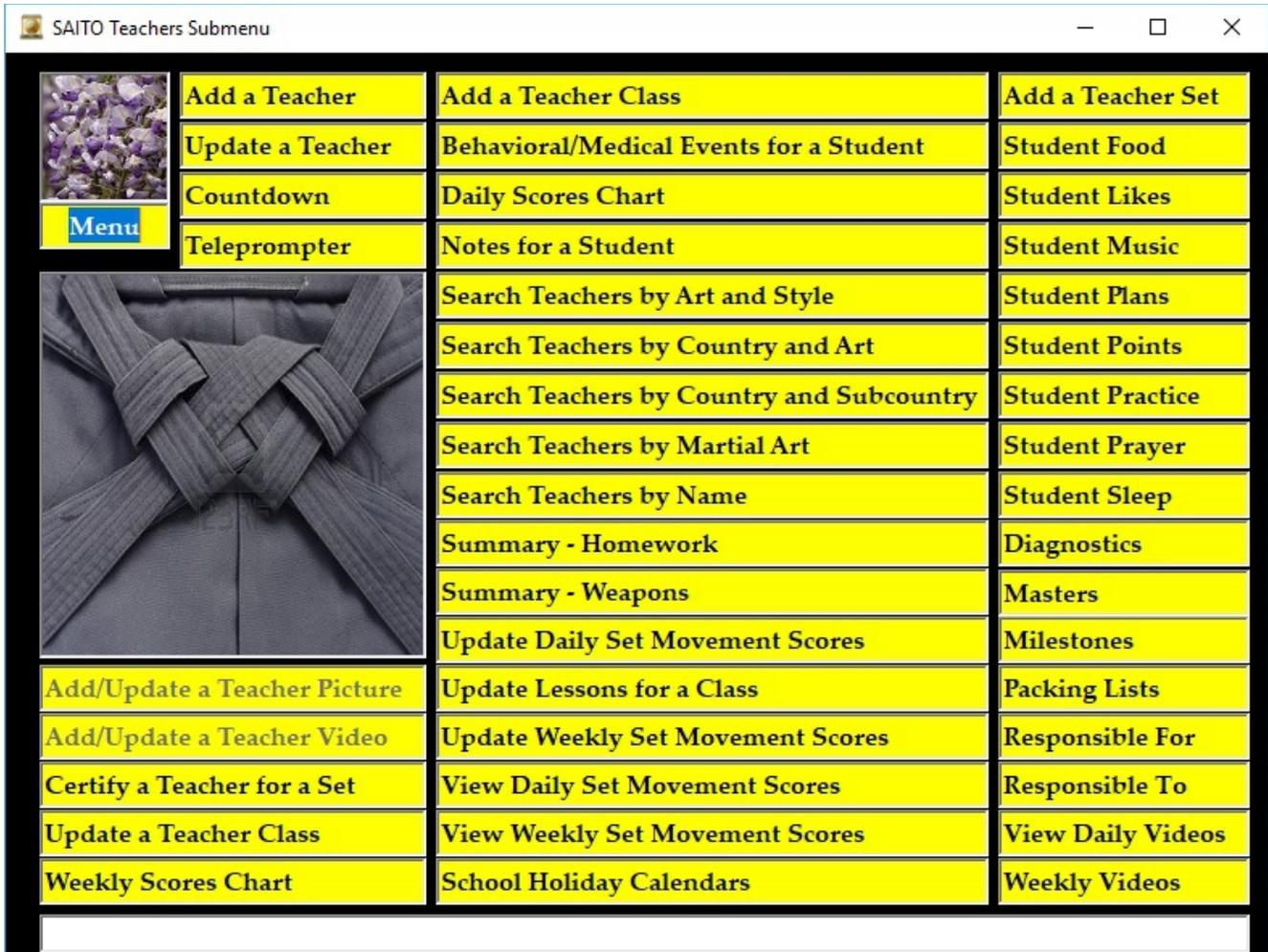
/1/ The instructor and assistants arrive between 8:00 and 8:30. There are procedures if there is no electricity, the computers are not functioning or if the SAITO software is not working. In the event of a more tranquil day the SAITO application starts and one sees



/2/ everyone signs in using biometrics

/3/ the text boxes with the white backgrounds (rightmost column) give status of various aspects of the SAITO operating environment. Of course, the language would be French. The EXE version would be highlighted if there had been a change to SAITO overnight.

/4/ clicking the Teachers textbox (rightmost of the two columns of yellow textboxes – third from the bottom) displays the teachers submenu



/5/ Clicking Countdown (near the top left) on our very cluttered teachers submenu

SAITO Class Launch Countdown for a Teacher

Schools: Bay Point Contra Costa - West 2000 Mendocino Dr

City	Description	Street
Bay Point	Contra Costa - West	2000 Mendocino Dr
Brentwood	Contra Costa - East	16585 N. 92nd Street Suite 112
Santa Cruz	Academy of Martial and Internal Arts	1570 Soquel Dr

Description	Measure	Description	Measure
Teacher signed in	Y	Aides Expected	7
Aides signed in	6	Aides absent	1
Aides tardy	0	Students expected	16
Students signed in	15	Students tardy	1
Students absent	0	Students unaccounted for	0
Students assigned to an aide	14	Smart watches	15
Smart glasses	12	Projectors expected	4
Projectors working	4	Cameras expected	9
Cameras working	9	Server online	Y
Backup server online	Y	Internet connection	Y
Wear black cottons	N	Wear silks	N
Snacks prepped	24	Drinks ready	60
Lessons assigned	5	Special guests attending	N

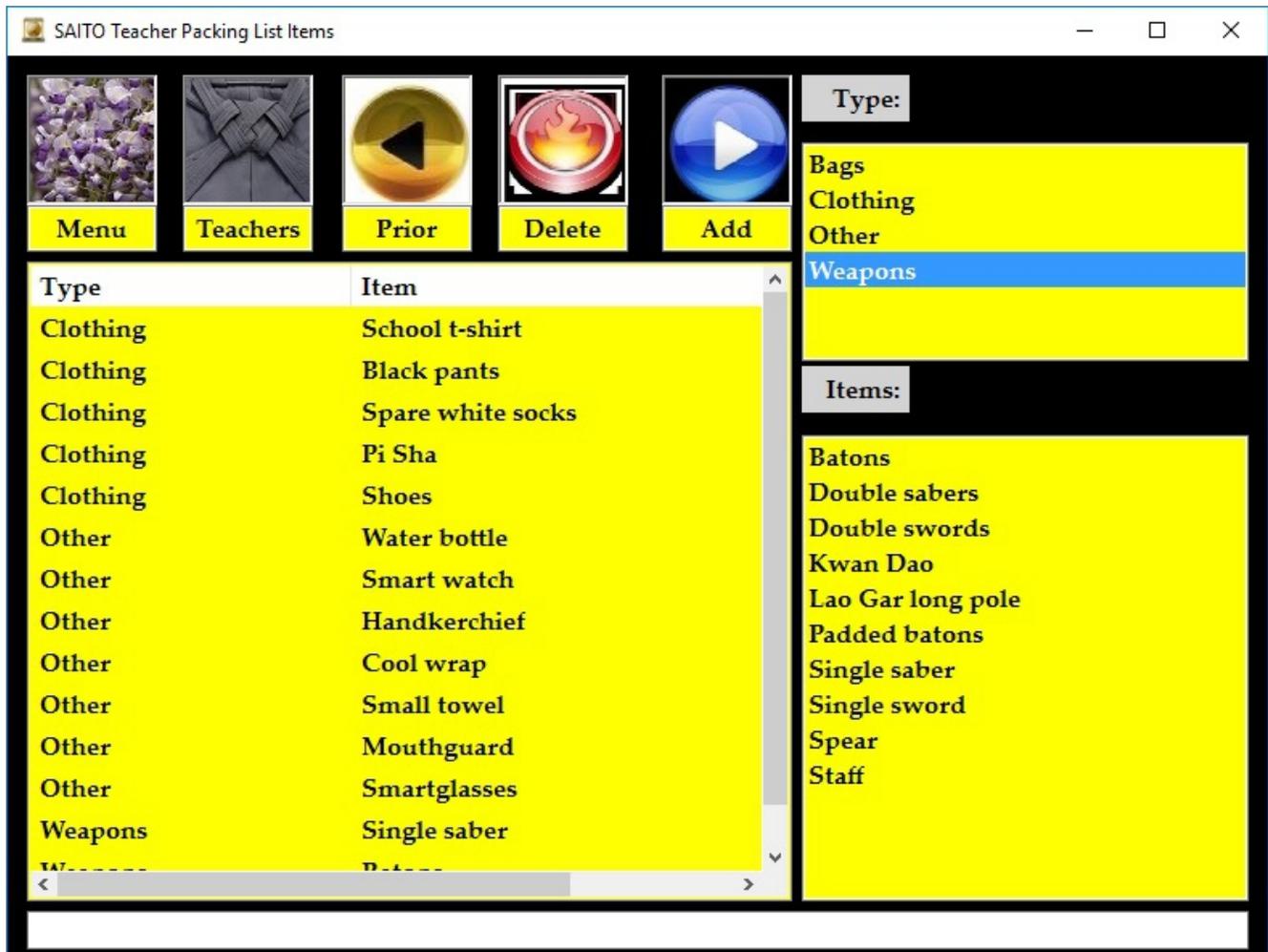
/6/ An aide will be absent (at least he or she emailed or called).

A student will be late.

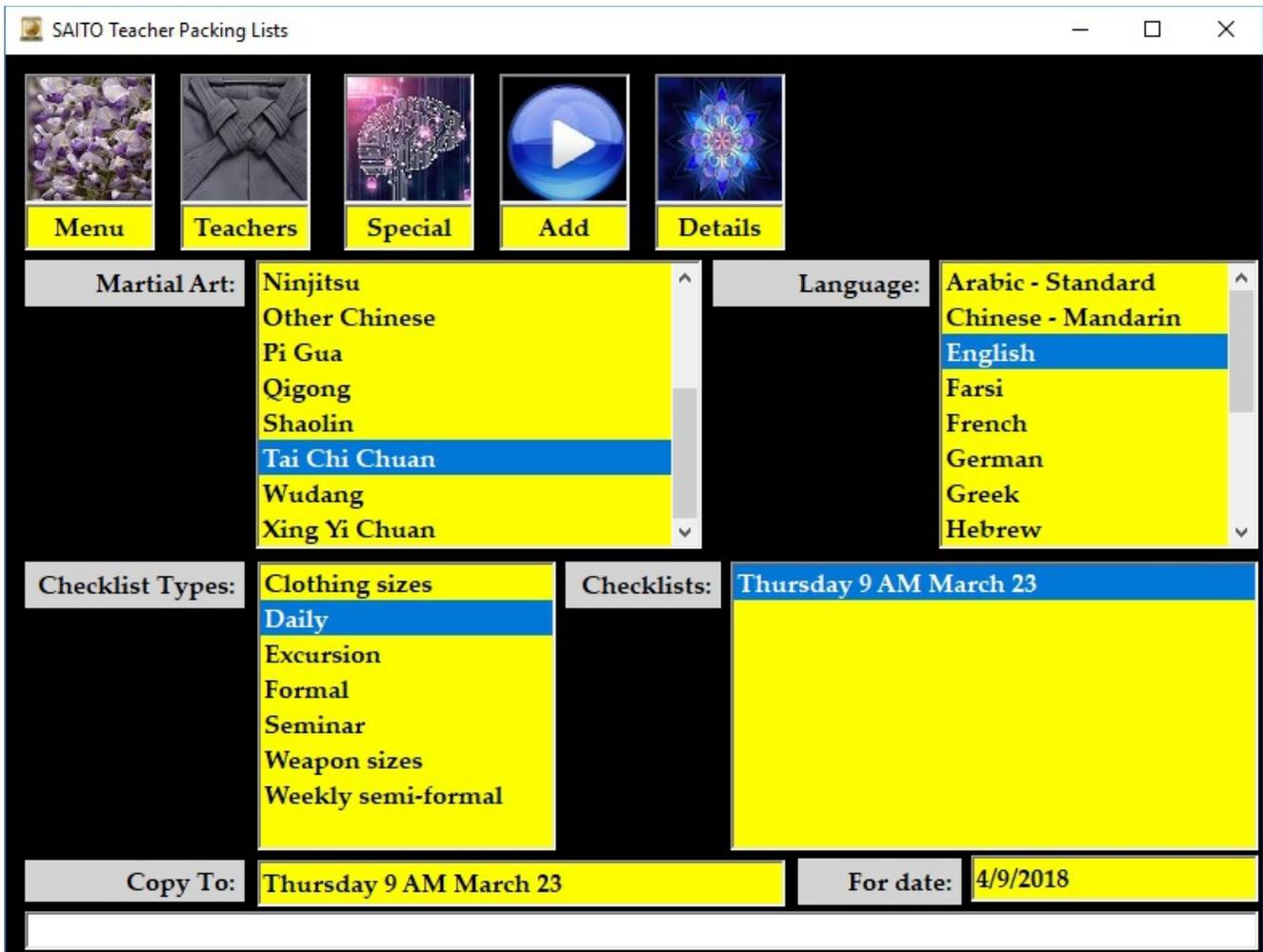
A day in the life.

Note that **we currently are very UNHAPPY with the so-called smart glasses**. The intent was to use them instead of projecting videos on mirrors. Some students dislike anything on their faces and dislike the closeness of the images. The glasses have to be strapped on or they fall off frequently. The glasses bounce poorly – even if not stepped on a few falls on the floor and the glasses are done. Connectivity is intermittent so the video is not smooth. It is difficult to verify that the video is even showing, let alone that it is at the correct point in time. We had hoped glasses could be used by students studying at home. **NOT RECOMMENDED.**

/7/ It turns out we always have to check email and telephone messages for last minute communications. Returning to the teachers submenu we click packing lists



the above is a generic list for the class – all the students get these items on their tables.



/8/ There are different packing lists depending on what the class is doing that day. Clicking *Special* (in the middle of the row of phillemes across the top) displays lists of special handling items for each student

SAITO - Student Special Items Checklist by Class



Menu



Teachers



Prior



Export

Teacher:

Cusoman, Ted
 Li, Violet
 Yan, Jack
 Zoll, Cecilia
Zoll, Peter

School/Class:

Chen style Tai Chi 18 Movements 11:00
 Chen style Tai Chi Double Batons 10:00
Chen style Tai Chi 18 Movements 07:00
 Chen style Tai Chi Lao Jia second half 22:30
 Chen style Tai Chi Single Saber 05:00

Student Special Items:

Name	Item
Dick, Chan	headband
Harp, Ellen	shoehorn
Thrun, David	visor instead of baseball cap
Zoll, Cecilia	glare reducing glasses
Zoll, Cecilia	red playground ball
Zoll, Cecilia	white latex gloves

/9/ Support for these personal accommodations is almost universal in SAITO and common in our teaching and classroom management

/10/ Students start arriving and they sign in with the biometric fingertip readers. For the purposes of brevity this will be a day where everyone who was expected to be on the bus got off the bus. Arrangements vary – sometimes the bus or van driver is an aide.

/11/ Students grab a pair of socks and head into the locker areas. They usually change socks and shoes. Students then walk to the training area and sit in their seat.

/12/ When everyone is more or less ready a gong sounds and class begins with the teacher leading a formal bow followed by a formal salute. We encourage the students to acknowledge witnessed courage on the street by saluting and giving a thumbs up.

/13/ Class begins with a few minutes of Wuji style sitting and standing meditation with special emphasis on breathing.

/14/ We then do the centuries-old Chen Family style warm-up exercises

/15/ These are followed by the short form known as the 18 movement set. Students are surrounded by video projections of the Grandmaster performing each set. Eventually students do this set twice.

/16/ There follows a set of exercises with the tool known as the tai chi ball. Note: for reasons of safety and economics we do NOT use the traditional wooden or stone spheres, but rather we prefer rubber playground balls.

/17/ Next is the comparatively short weapons set known as Double Batons (sometimes translated as maces). Weapons training begins the first day with a single padded stick and progresses through two padded sticks to two wooden sticks (below left). The steel versions (below right) are too expensive, too dangerous and too heavy for beginners. Everybody likes weapons so they take the place of candy in some situations. Weapons also teach respect for space – the space of one's own and the space of others.



/18/ It usually consumes about thirty minutes to get to this point. We take a short water break. Students can always ask for water at any time.

/19/ we start again with a Qigong set named Ba Duan Jin – usually translated as Eight Brocades. Its history goes back at least to the Sung Dynasty (960-1279) so it predates Tai Chi Chuan. The primary emphasis back of Ba Duan Jin is the circulatory and

respiratory systems.

/20/ The class then does Lao Jia (= Old Frame), which is the signature set in Chen style.

/21/ Next are exercises with a Tai Chi tool known as the ruler. The emphasis is on hips, balance, forearms and wrists.

/22/ If the class is reasonably proficient with double batons we then do the always-popular single saber set. Note that although the blade is not sharp we still emphasize to the students that “iron sharpens iron”, which is taken to mean that the saber sharpens the student.



/23/ the first half of class ends with a snack break. Our current thinking is a small bowl of rice. It is difficult to find foods that the majority of the class can eat. We have considered the possibility of serving everyone a small bowl of congee (rice porridge) before class as a way of starting everyone from the same point and as a way of eliminating many of the effects of hunger. We would like to add tooth brushing.

/24/ we start again with a Qigong set named Yi Jin Jing – usually translated as Tendon Strengthening. Its history goes back at least to the Han Dynasty (206 BC – 220 AD).

/25/ Next are exercises with a Tai Chi tool known as the bang. The emphasis is on knees, balance, arms and hands.

/26/ If the class is making good progress with Lao Jia we then do a vigorous unarmed set named Cannon Fist.

/27/ If the class is making good progress with single saber next we do single sword



/28/ It usually consumes about thirty minutes to get to this point (so 90 minutes total so far). We take a short water break.

/28/ we start again with a Qigong set named Wu Qin Xi – usually translated as Five Animals Frolic. The animals are tiger, deer, bear, monkey and eagle. Its history goes back at least to the Eastern Han Dynasty (probably around 200 AD).

/29/ If the class is making good progress with single sword next we do eyebrow height staff and, eventually, spear. Spear tends to require a lot of space.

/30/ We use traditional Chen Family exercises called Silk Reeling as the beginning of cooling down.

/31/ These are followed by a Qigong set named Liu Zi Jue (Six Sounds Breathing)

/32/ Class ends with a formal salute and a formal bow

/33/ The teacher makes any announcements about tomorrow's class and then everyone changes out of socks (and usually shoes and t-shirts) and signs out.

Certificates of accomplishment are separately awarded in each of the eight sets. It is something of a mantelpiece moment when a lineage-holding grandmaster publicly verifies that a family's special needs child correctly performed a set the grandmaster's ancestors have been performing and teaching for five centuries. All eight sets are required for a bachelor's degree. The master's degree material is taught at a somewhat brisker pace and requires proficiency in Xin Jia (New Frame – a re-interpretation of Old Frame), Xiao Jia 108, Xin Jia #2, double saber, double sword, kwan dao (the halberd - see page 24) and long (3 meters) staff. There are also five more Qigong sets and three more Tai Chi tools (bent bang, long bang and bar).

Usually there is a frantic burst of activity to send out any compliments, comments about behaviors and scores before the next class arrives.

ACTIVE RESEARCH TOPICS

Alternative tools

/1/ As mentioned previously in the comments on batons and maces) some weapons and tools are not optimal for many of the students of interest. In a manner similar to the tactics used with maces/batons we substitute an inexpensive playground ball for the all wood tai chi call. The former is far cheaper, much more available and considerably safer. In addition, the rubber balls are much more acceptable for students with hypersensitive skin or limited dexterity in their hands. Likewise, traditional grip strengthening exercises have used brass rings (below left), chi gu stones (below center) and nigiri game jars (below right).



These are all time-tested techniques for neurotypical students, but much too expensive, heavy and dangerous for the students of interest.

/2/ Instead, we find that silicon grip rings (next page on the left) are superior: cheaper, safer, lighter, more available and much easier to change weights. Of interest is that the oval rings (next page pictured to the right) are much more effective for many manifestations of cerebral palsy and arthrogyriposis where hand dexterity and strength may be limited.



Extending sensors

Originally we had expected to mount location sensors reporting $x y z$ coordinates in clothing. Those were to automate the scoring of daily tai chi routines by having students watch an enlarged projection of a grandmaster and following along. The grandmaster would have been filmed wearing smart garments so the grades could be determined by comparing the relative reported locations.

/3/ Then it became obvious for several reasons that seizures had to be avoided or pre-empted. This meant mounting bio-sensors measuring heart rate, blood pressure and temperature on at least one wrist. We have not demonstrated that this is an optimal placement or that just one such smart watch (that does not tell time) is sufficient. It is yet to be determined what strap arrangements and materials are best. These sensors are likely to be useful for bradycardia, overheating and tachycardia as well.

/4/ Several researchers at Harvard Medical School e-wrote to inform us that, while measuring movements so precisely and at such scale was groundbreaking, they were convinced that there was merit to measuring stillness. In particular, head sway during sitting and standing meditation was highly correlated to both the frequency of falls and the likelihood of injury. They were focused on older women with bone loss problems, but made a compelling case that head sway measurement was very important for everyone.

/5/ Then we “discovered” that there is a great deal of chronic foot pain. How much influence it has on gait has to be explored. It was distressing to realize there is suffering that has been ignored because the students/patients lack a vocabulary to communicate it and might have severe expressive language limits as well.

/6/ In several sub-types of arthrogyrosis and of cerebral palsy there is a chronic arthritis-like condition in the fingers, hands, wrists and forearms. In some cases the pain extends to the elbows and even to the deltoids. It may be the case that temperature sensors detecting variances above and below normal will shed additional light on this shadowy area of knowledge. Of particular interest to us is whether various Qigong and Tai Chi movements (empty-handed, with tools or using weapons) temporarily alleviate (or aggravate) such pain, and whether the change is measurable. One open question is how many temperature sensors and where are they to be located.

/7/ Traditional encephalitis has a bewildering array of causes. It is conjectured that a genetic condition may exist that requires an environmental trigger. For example, NMDA receptor antibody encephalitis may occur when a patient has a genetic predisposition AND there is a trigger like food or smoke. Of interest would be can we detect such a trigger using covariance analysis? Can any influence from Tai Chi Chuan be measured? Can the problem be detected and predicted?

Appendix A - languages by estimated primary speakers

source: ethnologue.com

Language	speakers
French	63,210,000 prime language users in France
	3,010,000 second language users in France
	76,795,640 prime language users world-wide
	208,147,220 second language users world-wide
Portuguese	959,000 – almost all understand French
Alsatian	900,000 - almost all understand French
Italian	829,000 - almost all understand French
Picard	500,000 – almost all understand French
Spanish	453,000 prime language users in France
	– almost all understand French
Lorraine Franconian	400,000 – almost all understand French
Breton	206,000 but fading quickly
Catalan	126,000 – almost all understand French
Occitan	110,000 – almost all understand French
Corsican	150,000 - – almost all understand French
Arpitan	145,000 – very fragmented
French Sign Language	100,000 – 170,000 discussed previously
Basque	72,000
Western Armenian	70,000 - almost all understand French
Luxembourgish	40,000 – almost all understand French
Vlaams	30,000
Sinte Romani	28,400
Norman French	17,000 – almost all understand French

Calo	15,000 - – almost all understand French
Errominxela	1,000 – almost extinct
Ligurian	400 – almost extinct
Zarphatic	extinct

Among immigrants the linguistic situation is less easy to assess

Language	speakers
Algerian Spoken Arabic	1,350,000
Moroccan Spoken Arabic	1,140,000
Kabyle	537,000
Tunisian Spoken Arabic	447,000
Turkish	444,000
Creole French (Lesser Antilles)	155,000
Central Atlas Tamazight	150,000
Khmer	50,000
Iranian Persian	40,000
Wolof	35,000
Balkan Romani	10,500
Vietnamese	10,000
Vlax Romani	10,000
Hmong Daw	10,000
Kabuverdianu	8,000
Morisyen	1,000
Western Cham	1,000

Appendix B - Urbanization

The arguments about cities versus metropolitan areas do not appear likely to end soon

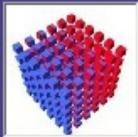
City	Population
Paris	2,206,488
Marseille	861,635
Lyon	513,275
Toulouse	471,941
Nice	342,522
Nantes	303,382
Montpellier	277,639
Strasbourg	277,270
Bordeaux	249,712
Lille	232,741
Rennes	215,366
Reims	184,076
Saint-Étienne	175,318
Le Havre	172,366
Toulon	167,749
Grenoble	160,649
Dijon	155,114
Angers	151,520
Nîmes	150,672
Le Mans	143,325
Aix-en-Provence	142,668
Clermont-Ferrand	141,398
About 80% of French live in urban areas	

Appendix C – Screenshots from our HERON software



The main menu – the first thing a HERON user sees. The colors are user defined so visually stimulating combinations can be used. In the examples the labels have white backgrounds and disabled text boxes have gray backgrounds. Nothing happens if one tries to type into these fields or click them with a mouse. The text boxes and listboxes (not shown here) with golden backgrounds can be clicked on – in some cases they can also be typed into. On this form the rightmost column of golden textboxes are largely administrative functions that see infrequent usage. The leftmost column of golden textboxes should, in an ideal world, be used throughout the day. At some point soon we will have to test HERON's portability to verify that it can run on Android phones, Chromebooks, Apple devices (MAC, iPad and iPhone) and whatever else is in use.

HERON - Cook Prepared Nutrients

Menu
Update

Location	Stored	Group	Nutrient
Refridgerator	2/19/2017	Dairy	Buttermilk

Cooked:

2/21/2017

8:28

Duration:

3

Cooking:

Bake

Notes: warm up on cookie sheet

Cooking Methods:

- Bake
- Boil
- Broil
- Crockpot
- Fondue
- Fry
- Microwave
- none

The atomic level of detail seems obsessive at first – until the apparently minor variations are shown to matter. We don't always understand what is going on. In the example above if one particular student drank any of several brands of buttermilk straight from the cool container he displayed some serious symptoms including projectile vomiting. But if the buttermilk is warmed in the oven (not on the stovetop or in the microwave) he digested it readily. The points of recording this are (1) other caregivers know what parents know (2) parents can observe any changes (3) parents could inform other parents anonymously that perhaps this method would work for another child.

For the record, a government-appointed psychiatrist asserted that the reactions were all psychological because the student wanted attention and had not been nursed correctly as an infant. The parents blindfolded their son, gave him cool buttermilk, filmed him being sick, and dumped the regurgitated debris on the psychiatrist's desk. No confirmation that the psychiatrist cleaned and watched the video.

HERON - Add a student pain report

Menu Prior Add

Student ID: 5 Name: Cecilia J Zoll

Location:

abdomen
chest
face
groin
head
left ankle
left calf
left elbow
left fingers
left gluteus
left hand
left hip
left jaw/teeth
left knee

Start Date: 3/28/2018 Start Time: 17:13

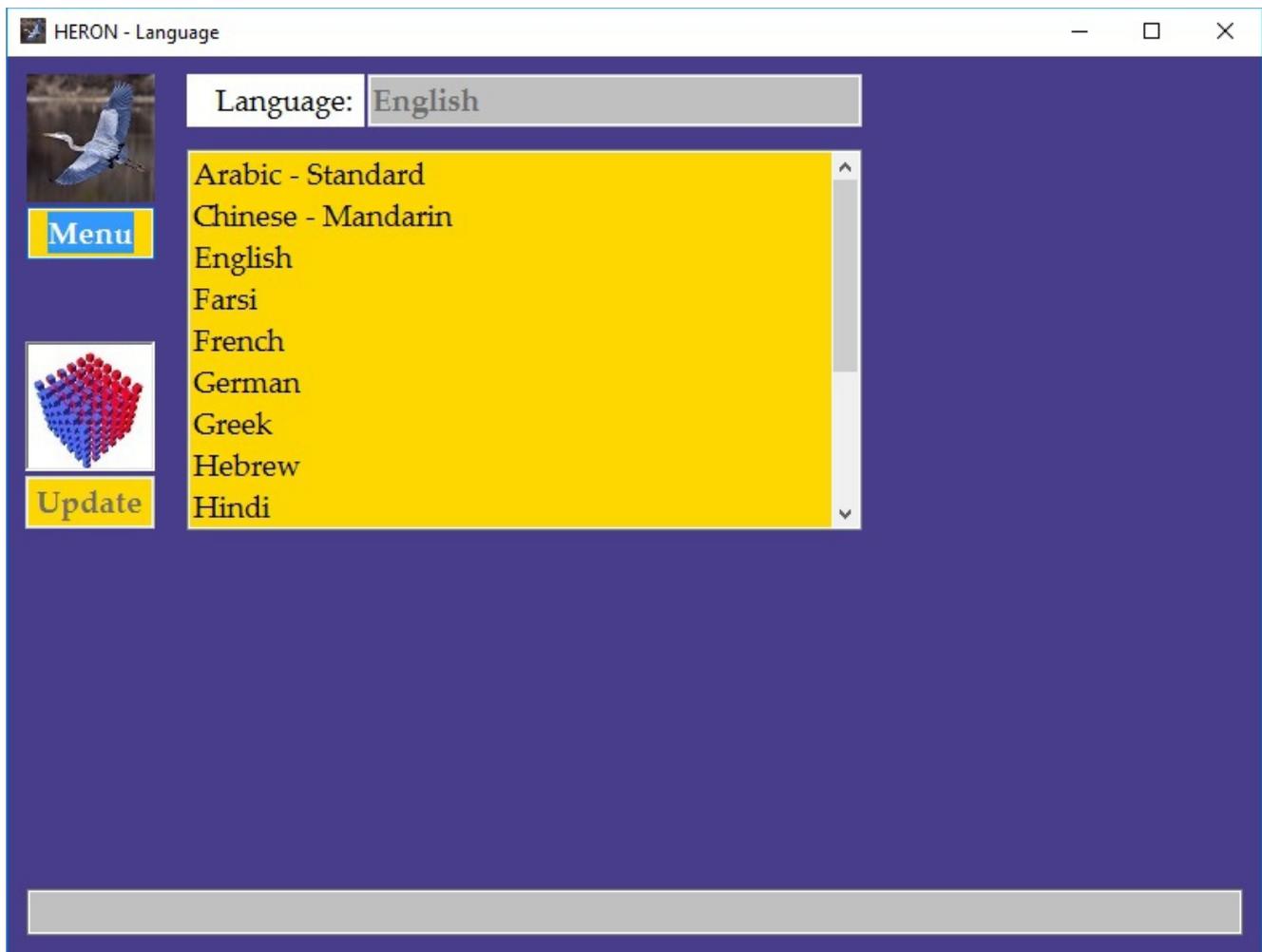
Duration: 5 minutes

Severity:

ache
cramp
dull pain
nausea
seizure
sharp pain

H050-48 Add successful

Getting students to communicate that they hurt somewhere (and what kind of pain it is) has proved challenging. In some instances – notably hands, arms, feet and legs – putting temperature sensors along the limbs may provide some measurements. What can be done for pain in the head and abdomen will require some thought.



In theory, clicking French here should change the titles of all forms (here HERON – Language in the top left), all labels (white background with text of 'Language' at the top) all contents of enabled listboxes and text boxes (with gold backgrounds) and all disabled text boxes (gray background with text of 'English' at the top). We would obviously need some translation help. We have no knowledge about whether software used in France must support other languages such as German, Spanish or Arabic. As is well-known, the Spanish, French, Italian, Portuguese and English languages more or less share an alphabet. As does the German language – it has a bad reputation for needing more characters to express the same concepts: *noir* versus *black* versus *schwarz*. There is good news and bad news. The good news is any translation work in HERON will be useful in our SAITO application. The bad news is SAITO is ten times the size of HERON.

HERON - Forms Lines of Code



Menu



Prior



Codes

Form	Description	Lines
frmIMSH037	GENES BY NAME	175
frmIMSH038	GENES BY NAME WITHIN A SYNDROME CATEGORY	258
frmIMSH039	GENES BY CHROMOSOME AND REGION	173
frmIMSH040	USER SUMMARIES BY CATEGORY SYNDROME AND GENE	228
frmIMSH041	CONNECT OR DISCONNECT A GENE AND A USER	366
frmIMSH042	UPDATE OR DELETE A SYNDROME	375
frmIMSH043	DISPLAY SCIENTIFIC NOTES FOR A GENE	120
frmIMSH044	GLYCEMIC INDEX RATINGS FOR NUTRIENTS CONSUMED O...	173
frmIMSH045	UPDATE A LOGGED EVENT	310
frmIMSH046	QUICK DIARY ENTRY	292
frmIMSH047	DISPLAY MISSING DIARY DATES	220
frmIMSH048	CHRONOLOGY BY SELECTED TYPE	250
frmIMSH049	DISPLAY STUDENT PAIN REPORTS IN A DATE RANGE	364
frmIMSH050	ADD A STUDENT PAIN REPORT	333
frmIMSH051	UPDATE A STUDENT PAIN REPORT	418
frmIMSH052	DISPLAY STUDENT PAIN REPORTS BY PAIN LOCATION WIT...	280
frmIMSH053	DISPLAY STUDENT PAIN REPORTS BY SEVERITY WITHIN A D...	280
modComm...	UNKNOWN	1,213
TOTAL	55	19,383

As can be seen above HERON is a relatively compact software application – it contains 55 Windows Presentation forms and nearly 20,000 lines of Windows dot net code. The executable (.exe) file is almost two megabytes in size – that's small by some standards. There are currently 42 tables in the ERODIOS (Greek for 'heron' or 'crane' – also the species name) – the size of the database varies with how much use is made of HERON. One hundred megabytes to one gigabyte would be a reasonable range of sizes on disk.

Appendix D – Screenshots from our SAITO software

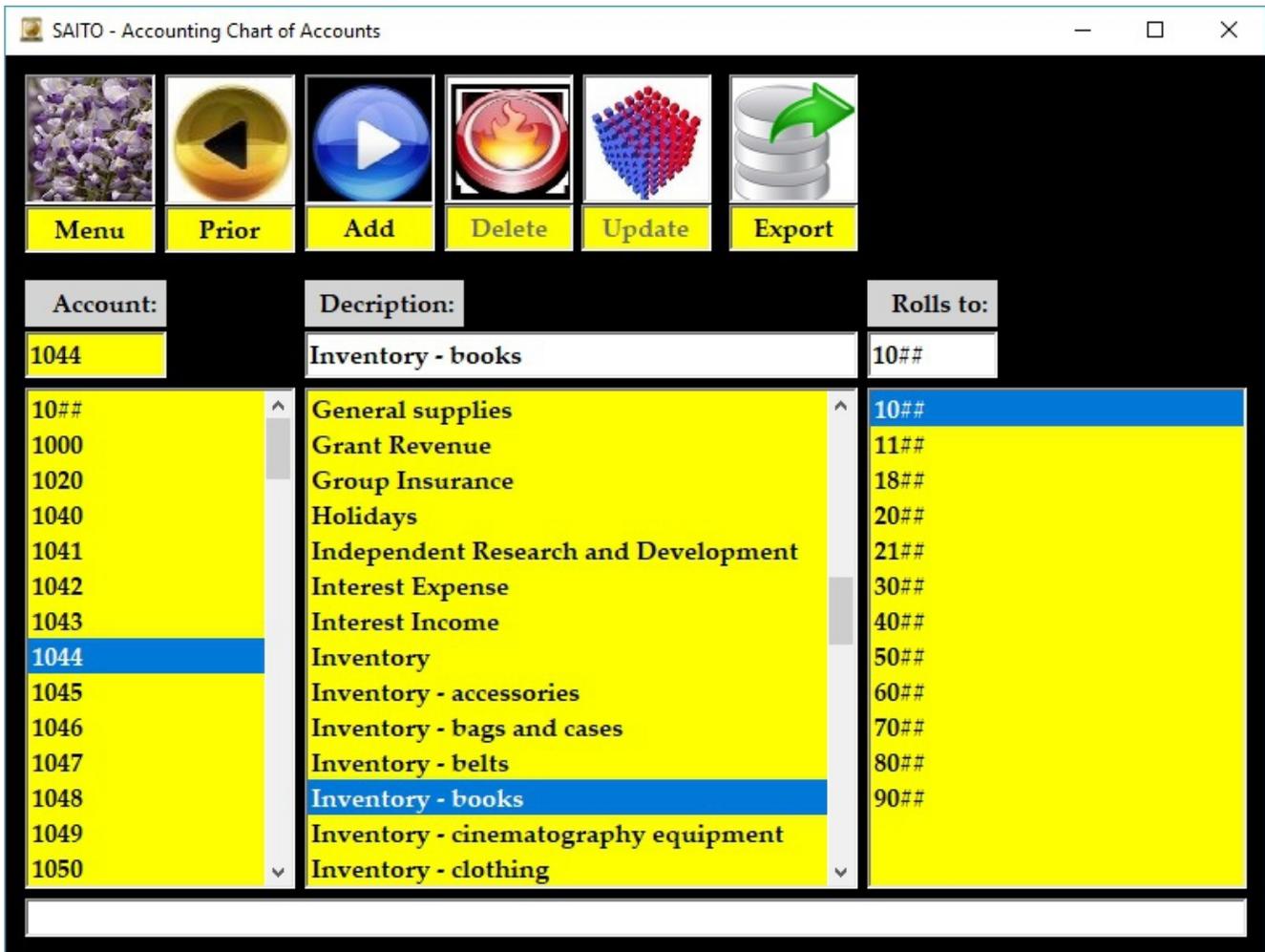
Here is a screenshot of the current SAITO main menu – the link for Accounting is a yellow textbox at the top center.

			Accounting	Financials	Battery:	Using AC
About	Contact	Admin	Agencies	Grading	Biometric:	URU enabled
			Aides	Investors	Database:	Azure - primary
			Audit	Lessons	Device role:	Classroom server
			Broadcasts	Marketing	EXE Version:	2.2.6.1
			Classes	News	Language:	English
			Curricula	Parents	Mode:	Production
			Dashboard	Students	Network:	connected
			Doctors	Teachers	Telephone:	Enabled
			Events	Telemetry	User role:	Sys admin
			Express	Videos		
			Sign Out	Sign In		

The somewhat drab accounting sub-menu form looks like



Clicking Chart of Accounts displays



Clicking the Export philleme (top just right of center) produces a printable chart of accounts that is also available as a spreadsheet (.xls file). Note that we distinguish types of inventory by using 104x and 105x accounts. We also distinguish the costs of the various utilities by using 803x accounts. The current chart of accounts follows

CHART OF ACCOUNTS

Account Description

10## Current Assets

- 1000 Cash
- 1020 Accounts Receivable
- 1040 Inventory - accessories
- 1041 Inventory - bags and cases
- 1042 Inventory - belts
- 1043 Inventory - books
- 1044 Inventory - cinematography equipment
- 1045 Inventory - clothing
- 1046 Inventory - computers
- 1047 Inventory - furnishings
- 1048 Inventory - musical instruments
- 1049 Inventory - other
- 1050 Inventory - posters
- 1051 Inventory - tools and rings
- 1052 Inventory - videos
- 1054 Inventory - weapons
- 1060 Prepayments

11## Property and Plant and Equipment

- 1100 Equipment - classroom
- 1101 Accumulated Depreciation-Classroom equipment
- 1110 Equipment - office
- 1111 Accumulated Depreciation-Office equipment
- 1200 Leasehold improvements
- 1201 Accumulated Amortization-Leasehold Improvement

18## Other Assets

1800 Deposits

20## Current Liabilities

2000 Current Note Payable

2010 Accounts Payable

2030 Accrued Wages and Payroll Taxes Withheld

21## Long Term Liabilities

2100 Note Payable

30## Equity

3000 Common Stock

3001 Retained Earnings

40## Revenue

4000 Commercial Sales

4010 Grant Revenue

4020 Interest Income

50## Direct Program Costs

5000 Direct Labor

5100 Consultants

5200 Equipment

5300 Materials and Supplies

5400 Travel

5500 Other/Misc

5600 Consortium/Contractual

60## Fringe Benefits

6010 Vacation

6015 Holidays
6020 Sick Leave
6025 Payroll Taxes
6030 401(k) Plan
6035 Group Insurance

70## Overhead

7000 Overhead Labor
7110 Amortization-Leasehold Improvements
7120 Depreciation-Classroom Equipment
7130 Depreciation-Office Equipment
7140 Rent
7150 Utilities
7160 Telephone
7170 Equipment Rental
7180 Expendable Equipment
7190 Repairs and Maintenance
7200 General supplies
7210 Travel
7220 Consultants
7230 Waste Disposal
7240 Training

80## General and Administrative expenses

8000 General and Administrative labor
8010 Amortization-Leasehold Improvements
8015 Depreciation-Office Equipment
8020 Rent
8030 Utilities - website hosting
8031 Utilities - domain registration
8032 Utilities - internet access
8033 Utilities - gas
8034 Utilities - electricity
8035 Utilities - water

8040 Telephone
8050 Equipment Rental
8060 Expendable Equipment
8070 Repairs and Maintenance
8080 Office supplies
8090 Travel
8100 Consultants
8110 Legal and Accounting
8120 Liability insurance
8130 Licenses
8140 Dues and subscriptions
8150 Postage
8160 Recruitment/Relocation
8800 Independent Research and Development

90## Unallowables

9000 Interest Expense
9010 Contributions
9015 Exhibits

We produce the following accounting documents monthly:

1. Chart of Accounts – with annotations of any changes
2. Balance sheets
3. Assets statement
4. Liabilities statement
5. Income summary
6. Revenues statement
7. Expenses statement
8. we have specialized aide time accounting statements (biweekly and monthly)
9. teacher time accounting
10. Project accounting

Appendix E – Tai Chi tools

	
<p>Wooden ball</p>	<p>Rubber Playground ball</p>
	
<p>Traditional Tai Chi bar</p>	<p>Porcupine ball and foot roller</p>
	
<p>Tai Chi ruler - cocobolo</p>	<p>Tai Chi bang – birdseye maple</p>
	
<p>Tai Chi bent bang</p>	<p>Tai Chi long bang – quilted birch – mostly for two person exercises</p>