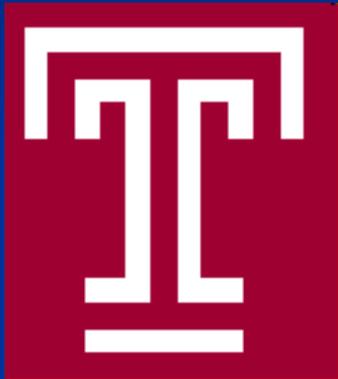


Road Cycling: Training and Racing



Matthew Furlow
Tim Manzella
Ross Marklein
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Roadmap

- **Training**
 - Basics
 - Training Plans
 - Training with power
 - Resources
 - Group rides
- **Racing**
 - Eastern Collegiate Cycling Conference (ECCC)
 - Categories
 - Race weekend
 - Types of races
 - Clinics

Training Basics

- Ride your bike, ride your bike, ride your bike
- Many different training metrics
 - Perceived exertion (PE)
 - Heart rate
 - Power (watts)
- Always include rest day(s) and cross-training day(s) in your schedule
- When you can, ride with people
 - Develop pack skills
 - Competition makes you faster
- Be prepared!
 - **ALWAYS BRING:** helmet, tubes, tools, pump, water, food, ID, money, phone, etc



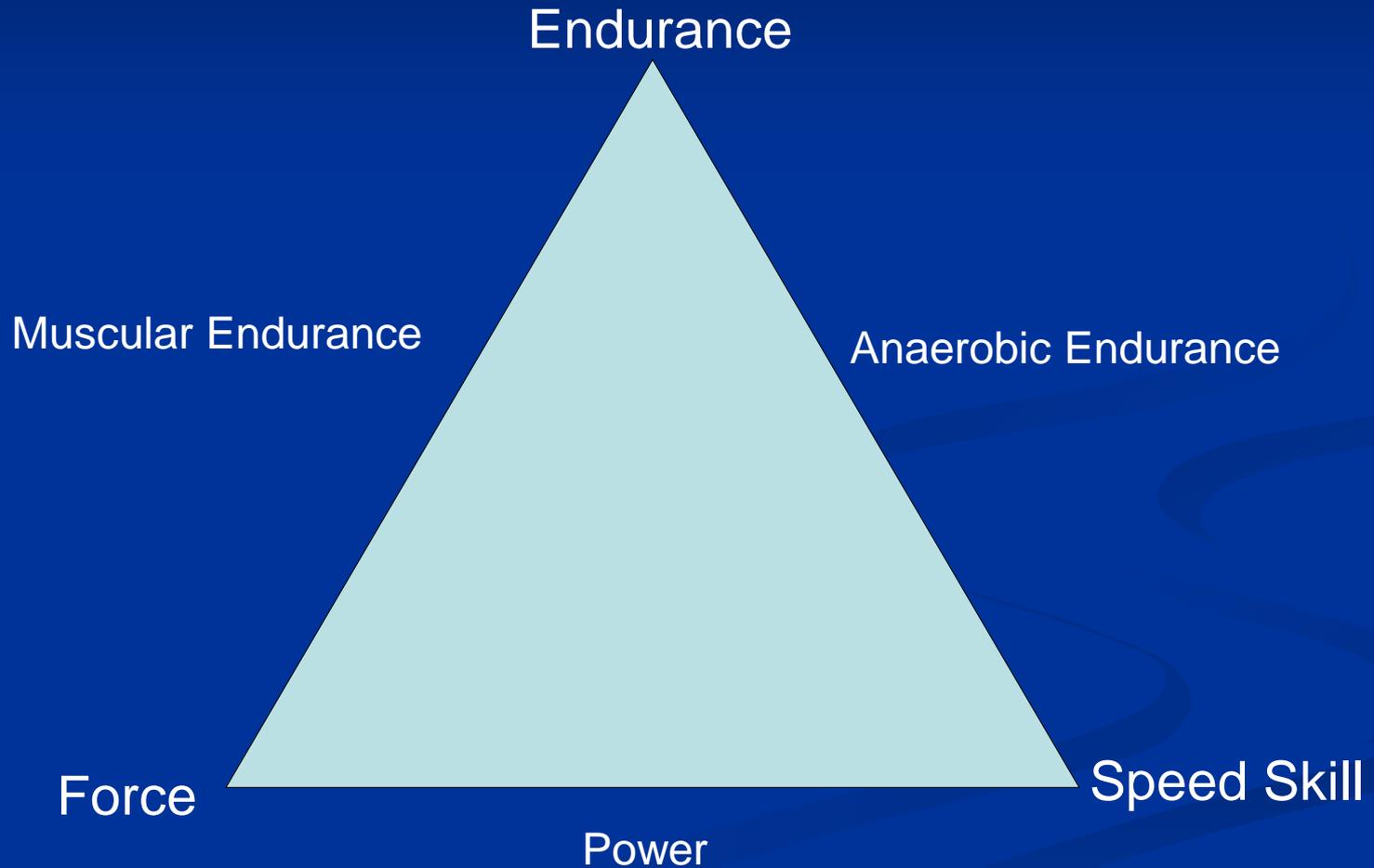
Developing a Training Plan

- Need to think about basic questions:
 - What are your goals/priority events?
 - When are those events or target dates?
 - What are your current capabilities?
 - What are your strengths? Weaknesses?
 - How much time can you realistically put toward training?
 - How predictable is your life?

Key Aspects

- Racing involves four general aspects:
 - Endurance
 - Speed
 - Strength
 - Skills and Strategy
- Need to work on improving each
 - Each requires different workouts
 - Just riding around usually won't cut it
- Training keys
 - Frequency, duration, and intensity

Performance Factors



Building Endurance

- Above all else, cycling is an endurance sport
- General to specific
- Increase until as long as the longest race (or 2 hours, whichever is more)
- Aerobic activity

Building Speed

- Two forms: Muscular endurance, anaerobic endurance
 - Time trialing vs sprinting
- Form is important!
 - High cadence (RPM) riding

Building Strength (Force)

- Weight lifting
- Hill rides (big gear, 50 rpm)
- Standing start sprints (big gear)

Things To Remember

- Be consistent and disciplined
 - Hard on hard days, easy on easy days
- Be flexible and realistic
 - Keep your priorities straight
 - Don't stress about unexpected events
- Don't forget skills
- Find a training partner or group!
- Have fun!!!

Training Plans- PE

- Perceived exertion— how hard are you going?
 - z1 = recovery
 - easy pedaling, no concentration
 - z2 = endurance
 - some concentration, can still form complete sentences/thoughts
 - z3 = tempo
 - requires focus, difficult, should be able to maintain the pace for 1-2 hrs
 - z4 = threshold
 - pretty difficult, little ability to converse, 10-20 minute efforts
 - z5 and above = supra-threshold
 - very short efforts (1-5 min) complete concentration required, very difficult

Training Plans- Heart Rate

- Requires heart rate monitor
 - Reliable monitors are somewhat expensive (\$100+)
 - Chest strap and receiver/computer on your bike
- Perform a field test protocol to determine training zones
- Keep your heart rate within a specific zone to focus on specific types of training (base, threshold, anaerobic, etc)
- Heart rate adapts relatively slowly to changes in effort, less useful for quantifying short efforts

Training with Power

Power: A powerful training
weapon

What is Power?

$$P_{\text{avg}} = \frac{\Delta W}{\Delta t}$$

- Power is a measure of work done (ΔW) over time (ΔT)
- Work is calculated by multiplying Force (N; $F=MA$) by displacement

The faster you spin or the harder you press into the pedals, the more power you produce

What does this mean?

- Power is absolute—unlike training by speed, cadence, heart rate, perceived exertion, or any other method, training by power is not subject to outside influences
- 300 watts is always 300 watts

Devices for Measuring Power

- Stationary bikes or trainers
 - Computrainer, Cyclops Powerbeam
- Hub-based
 - Powertap
- Crank-based
 - SRM, Quarq
- Wind-force-based
 - iBike
- Others forthcoming: Laserspoke, Pedals (Garmin) Cleats

How to Begin Training with Power: 2 Tests

Functional Threshold
Power (FTP) Test

Rider Profile Test

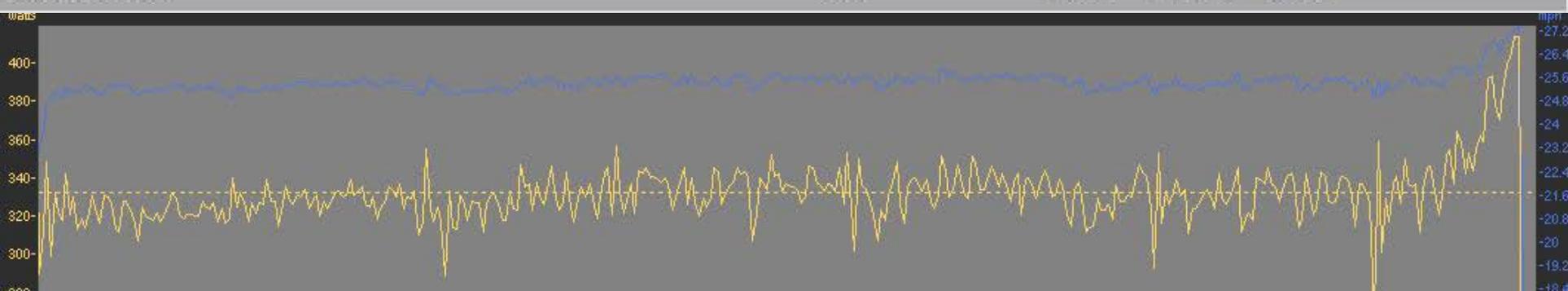
FTP Test

- FTP=Maximal sustainable average power for exactly 60 minutes
- Establishes Training Zones

Power Training Zones Options ▾

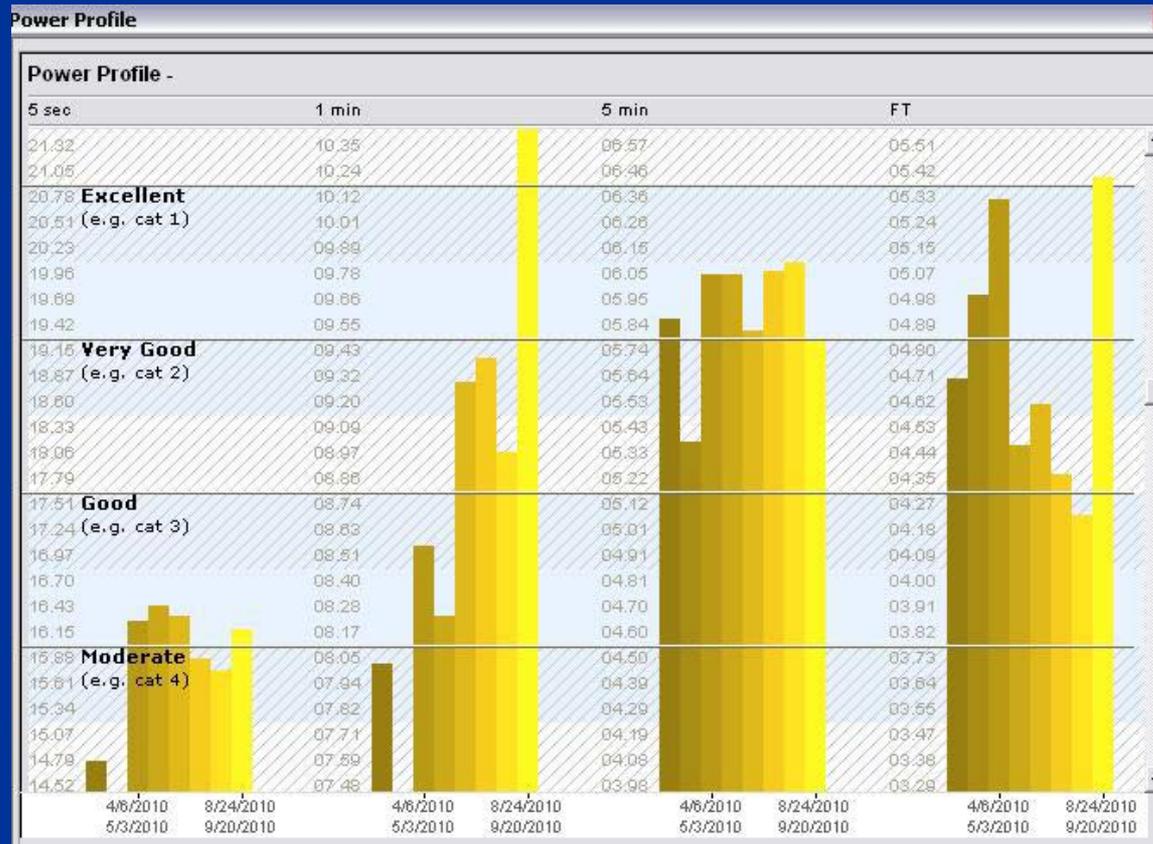
Effective and after

Name	Abbr	From	To		Threshold
Anaerobic capacity	AC	321	up	▲	<input type="text" value="265"/> watts
VO2max	VM	281	320	☰	
Threshold	TH	241	280		
Tempo	TE	201	240		
Endurance	E	148	200	▼	



Power Profile Test

- Establishes what sort of rider you are
- Evaluates relative strengths and weaknesses



Where to Go from There

Accumulate racing and training data

From: 12/ 1/2009 To: 10/ 1/2010 Workout: --All Workouts-- Max Duration: 12:00:00
 Find: Hide blank

>>	Date	Graphs	Spot	Workout	Duration	TSS	IF	Workout Goal	Notes
X	Fri 3/13/2010	PCSD	Bike		3:40:00.00	92.2	0.502	Manual Entry, Great Harvest Ride + Van pickup on Trek	Manual Entry -
X	Sat 8/14/2010	PCSD	Bike		1:18:40.00	102.0	0.882	Tour de Millersburg Crit. Lost track of lap count. Sprinted at 500 watts. 25th place, 5 out of points, easily coulda one better. FML. At least I did a good job spinning, so as to hopefully save legs for tomorrow.	Power-Tap
X	Sat 8/14/2010	PCSD	Bike		1:01:00.00	65.1	0.800	estimation for TT + good warmup @ Tour de Millersburg. Brakes flubbing slightly, lost maybe a couple watts. 39th place, 10 miles, 21:00. Flat course.	Manual Entry -
X	Sun 8/15/2010	PCSD	Bike		3:35:23.00	216.3	0.776		Power-Tap
X	Mon 3/16/2010	PCSD	Bike		3:16:32.00	142.3	0.659	Endurance Ride with Brett down VF trail to Phoenixville crit.	Power-Tap
X	Tue 8/17/2010	PCSD	Bike		4:11:39.00	216.9	0.719	Tempo VF & back via gulch/trail with Tyler, then Drives. Stopped at La Colombe for pastry. Very tired legs, didn't eat enough, didn't do much on drives.	Power-Tap
X	Wed 8/18/2010	PCSD	Bike		4:11:00.00	207.3	0.704		Power-Tap
X	Thu 8/19/2010	PCSD	Bike		4:34:50.00	202.4	0.665	Conshy loop with Tyler + deathmatch, easy green tree, though fast, easy ride generally speaking, lots of stops, flat tires, etc. Still suffering after hard hard week. Finally a recovery day tomorrow.	Power-Tap
X	Fri 3/20/2010	PCSD	Bike		1:47:43.00	34.2	0.437	Great Harvest Aidmore plus a canonx loop with mel. Tired tired tired	Power-Tap
X	Sat 8/21/2010	PCSD	Bike		3:46:15.00	177.8	0.687	Tour de Medford. Break of 6 go away. 8th in field sprint, max 5th in field sprint. 20x over 900, 32x over 800, 51x over 700 watts, so definitely a surgy little crit. Also rode over & back with Nick.	Power-Tap
X	Sun 8/22/2010	PCSD	Bike		1:47:59.00	81.9	0.675	Way out to Chest County Crit in Phoenixville. Didn't race. Raining.	Power-Tap
X	Sun 8/22/2010	PCSD	Bike		1:28:15.00	77.5	0.726	Way home from Chester county Crit. Raining hard. 2 flats. Buh	Power-Tap
X	Mon 3/23/2010	PCSD	Bike		2:16:50.00	123.3	0.735	Easier ride with Tyler in the rain	Power-Tap
X	Tue 8/24/2010	PCSD	Bike		3:40:14.00	160.5	0.661	65 miler around Valley Forge in rain with Chris Johnson	Power-Tap
X	Wed 8/25/2010	PCSD	Bike		4:09:44.00	212.0	0.714	75 miler out around Feokosie with Chris Johnson	Power-Tap
X	Thu 8/26/2010	PCSD	Bike		0:05:20.00	6.5	0.856	Fat of the ride where sensor went out.	Power-Tap
X	Thu 8/26/2010	PCSD	Bike		3:24:58.00	185.5	0.737		Power-Tap
X	Fri 3/27/2010	PCSD	Bike		1:09:56.00	22.7	0.441	Solo ride to great harvest little ring only	Power-Tap
X	Sat 8/28/2010	PCSD	Bike		1:45:52.00	128.7	0.854		Power-Tap
X	Sun 8/29/2010								
X	Mon 3/30/2010	PCSD	Bike		1:23:54.00	82.5	0.768	30-second and 1-minute max efforts to gauge power	Power-Tap



M:5

- Entire workout (172 wat)
- Peak 5s (648 watts)
- Peak 10s (602 watts)
- Peak 20s (556 watts)
- Peak 30s (518 watts)
- Peak 1min (475 watts)
- Peak 2min (416 watts)
- Peak 5min (320 watts)

Duration: 5:01.14
 Work: 96 kJ
 TSS: 10.5 (1.122)
 Norm Power: 336
 VI: 1.05
 Pw:HR: n/a
 Pa:HR: n/a
 Distance: 1.002 mi

	Min	Max	Avg
Power:	90	469	320 watts
Cadence:	70	103	89 rpm
Speed:	10.1	16.5	12.0 mph
Pace:	3:39	5:58	5:00 min/mi
Hub Torque:	41	288	182 lb-in
Crank Torque:	81	488	307 lb-in

Navigation

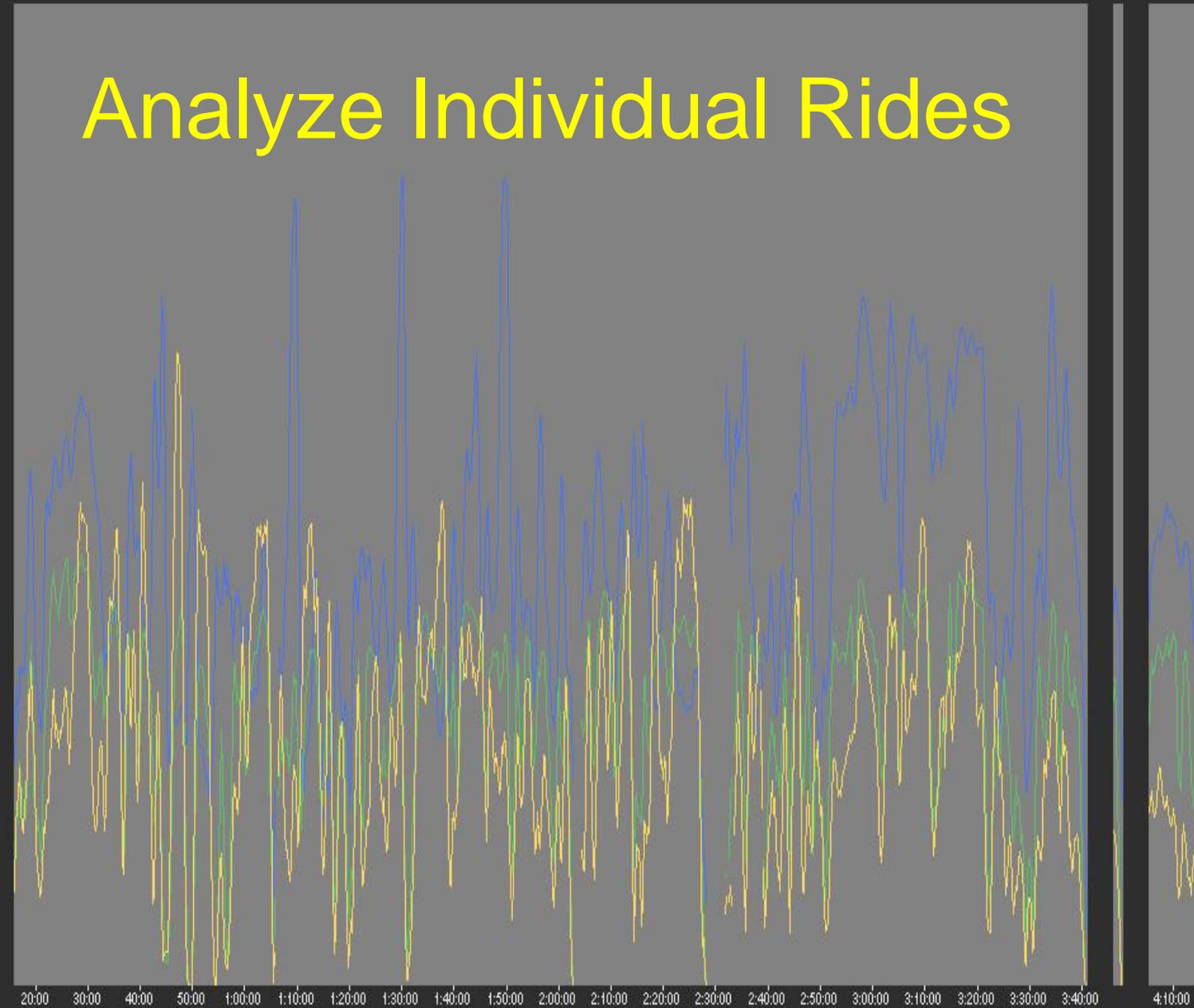
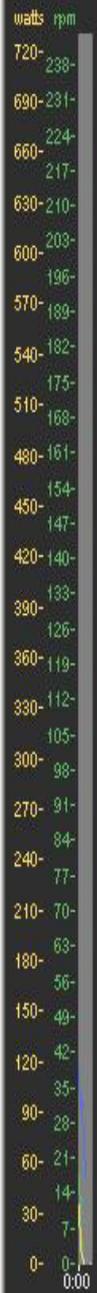
[TrainingPeaks WKO+ Home](#)

[Furlow, Matt](#)

[Zamastil, Charlie](#)

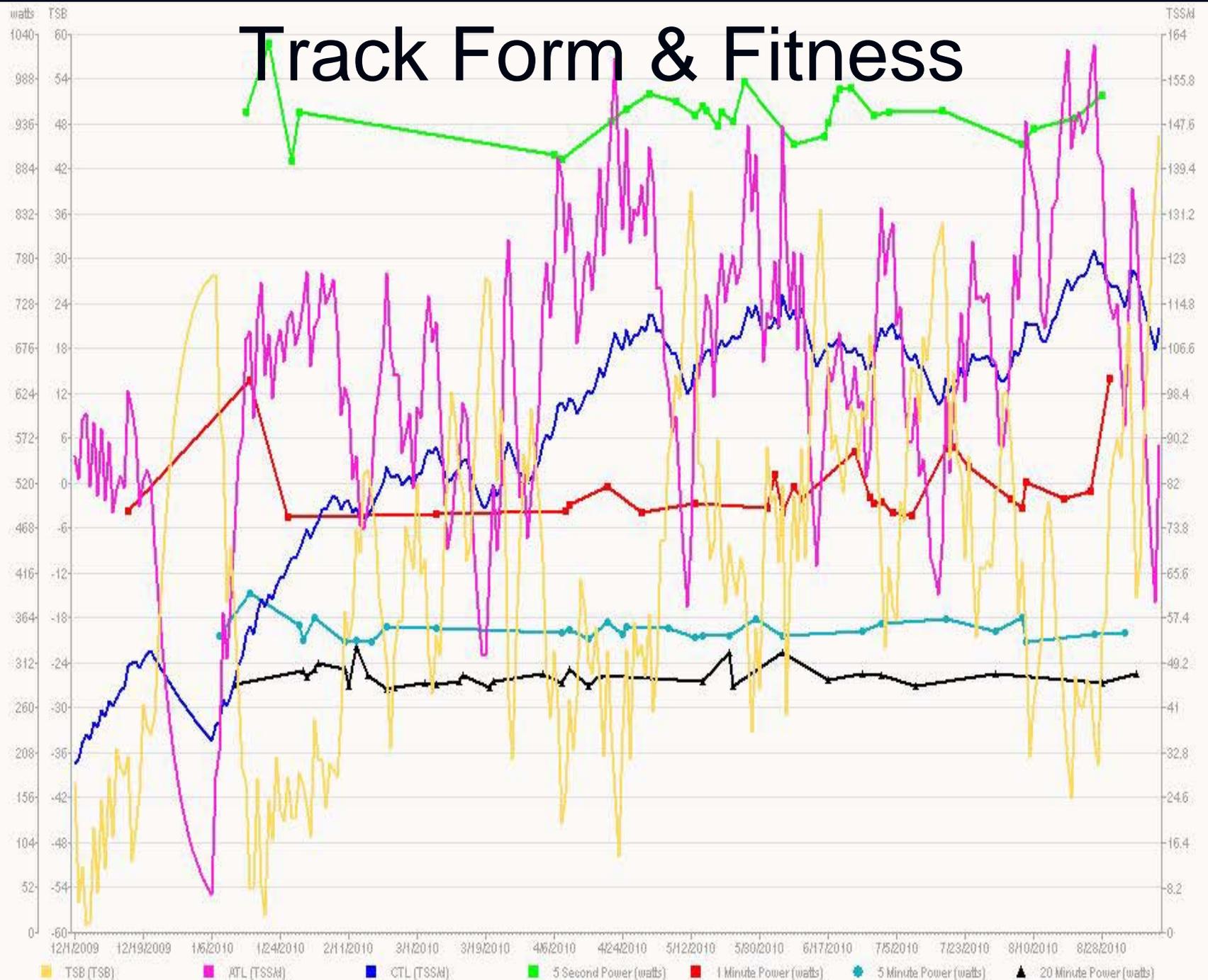
Mon 1/18/2010

Sat 2/13/2010



Analyze Individual Rides

Track Form & Fitness



Gauge Training, Racing, & Time Trial Pacing



Calculate Nutritional Needs

- Doing work requires Energy
- Power meters measure the amount of work done
- \therefore Power meters measure the amount of energy expended
- Calories measure the amount of energy in food
- \therefore Power meters calculate caloric requirements

Wrapping Up

- There is no more precise way to measure what you're doing on the bike than by using power
- Using power allows you follow your form, fitness, and even your caloric needs
- Training with power allows you to objectively evaluate your riding, from ride to ride, race to race, or season to season

Training Plans- Design

- BASE
 - Lots of riding, relatively low intensity (z2/3, endurance and tempo)
- BUILD
 - Start to work in intervals and intensity
- PEAK
 - Less hours (taper)
 - Openers
 - Few, short, intense efforts during an easy ride
- Periodization (3 weeks hard, one week easy, start over)
- Work in cross training (running, erg, other sports)
- Yoga/stretching and core

Training Hours

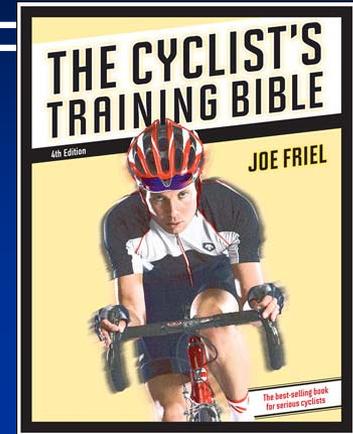
- Depends on goals
- Example (B racer): Four week segments (3/1)
 - Prep – 6 x 4
 - Base 1 – 7, 8.5, 9.5, 5
 - Base 2 – 7.5, 9, 10, 5
 - Base 3 – 8, 9.5, 10.5, 5
 - Build 1 – 9 x 3, 5 (Racing?)
 - Build 2 – 8.5 x 3, 5 (Racing?)
 - Peak – 7.5, 6 (Racing)

Intervals

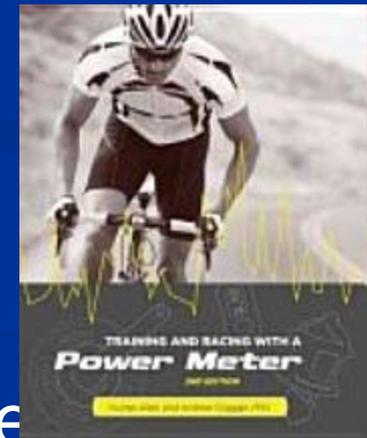
- Start once you have a base
- Different intervals work different systems
- Hills are a convenient place to get in intervals
 - Often less traffic
 - Climbing works different muscle groups
- Pyramid
 - Increasing, then decreasing, duration intervals
 - Good trainer workout
- Repeats “on/off” “over/under”
 - 1 minute z5+, 1 minute easy, repeat
- Attack intervals
 - 15 sec sprint, 45 sec z5+, 5 min rest, repeat
- Hill repeats
 - Go all out on hill, comparable duration of recovery, repeat
- Tempo Riding
 - Hard riding with some sprints thrown in

Training Resources

- The Cyclist's Training Bible- Joe Friel



- Training and Racing with a Powermeter- Hunter Allen

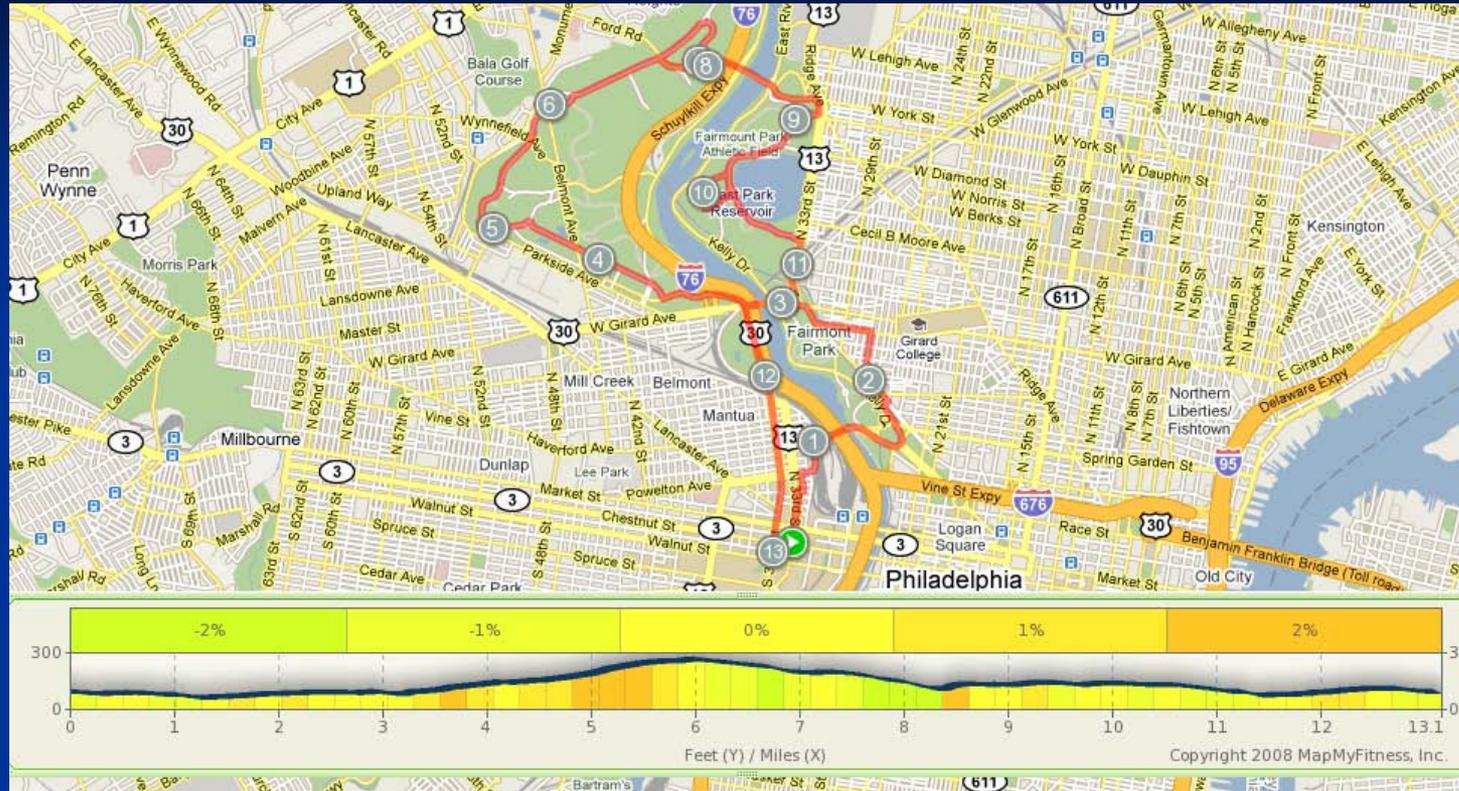


- “Wattage” Google group
- Training Peaks “Power 411” online
- Coaching– Breakaway and Cadence

Pack Riding Skills

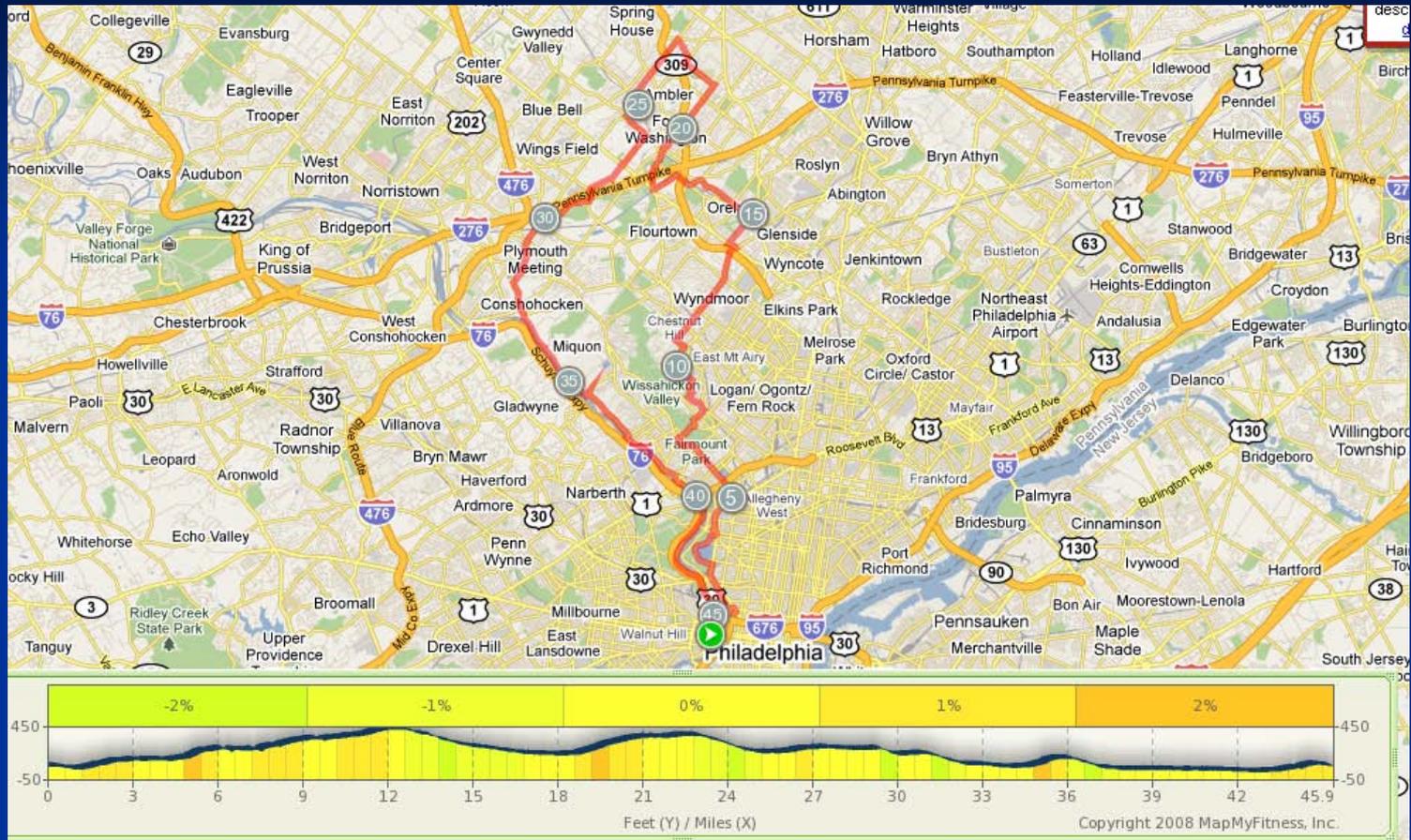
- Holding a Wheel (drafting)
 - Should become comfortable being 6-12" behind the person in front of you
- Cornering
 - Follow the line of the person in front of you
 - Inside foot up, outside foot down, weight on the outside foot and inside hand
- Where to ride
 - On the road– stay to the right
 - Within the group– stay compact, don't overlap wheels
- Hand signals
 - Point out debris, holes, etc
 - Slowing, stopping, turns
- When to drink/blow snot rockets
 - Drinking– make sure you have 10 sec free
 - practice such that you don't have to look at your bottle
 - Stay alert– keep on hand available for braking/shifting
 - Snot rockets– aim down, helps to bend down s.t. head is near handlebars
- Skills important for racing
- **BE PREDICTABLE**

Group Rides– Bulldog



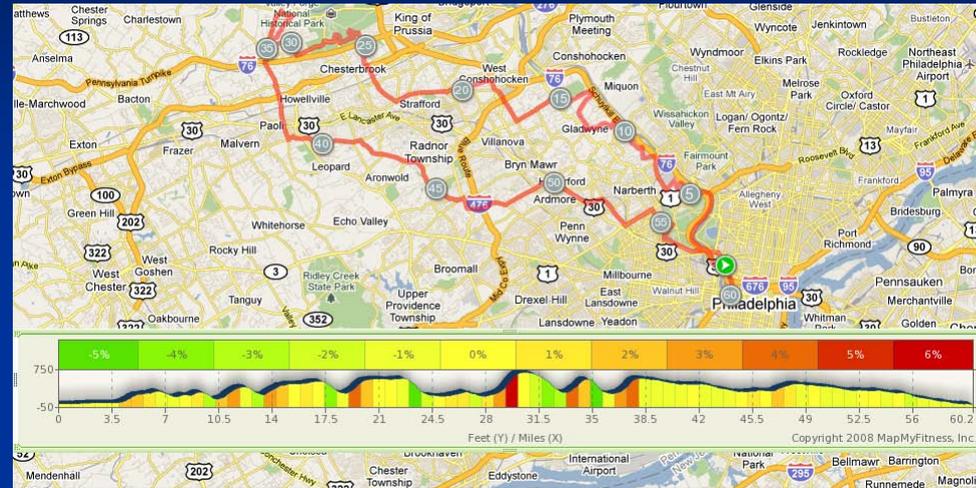
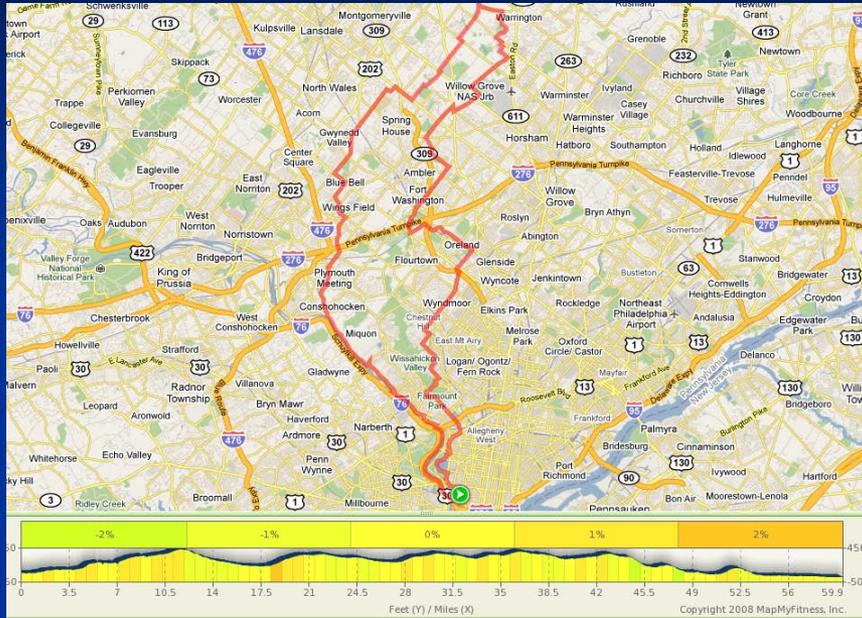
- Tuesdays/Thursdays at 6:30 pm at Bulldog Statue at 25th and Fairmount (replaced by Points Race on Thursdays in Feb)
- 8/12 mile loops through Fairmount park
- Sprints on the hills, regrouping after sprints

Vino Velo



- Saturdays at 9 am at Italian Fountain behind Art Museum
- ~45 mile ride to/from Ambler
- Several sprint points, some minor hills; DROP ride; only attend if C+/if you have a cue sheet

Base Rides

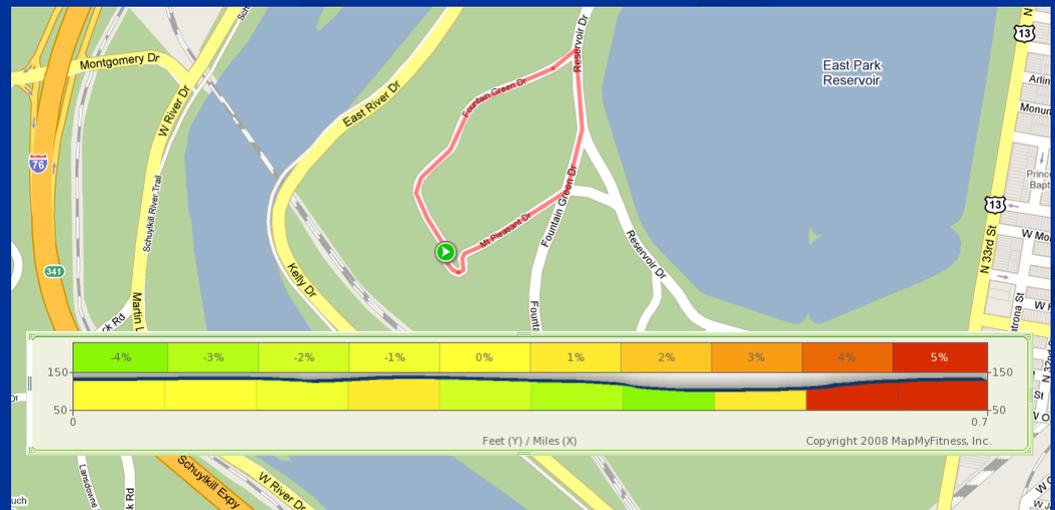


- QCW base rides Sunday 8:45 AM from Bulldog Statue at 25th and Fairmount
 - No-drop rides, though rides are separated according to ability
- Cadence Ride – 9 AM Saturday from Cadence in Manayunk
- UNO ride– Saturdays in NJ, fast pace, advanced riders
- 50-100 mi
- Cue sheets available on request (if you want to lead a specific ride)

Points Race



- Practice criterium in Fairmount Park
- Thursdays at 6:30 pm at Mt Pleasant Mansion (starts in Feb)
- Initially gear restricted
- Sprint every 5th lap
- Significant collegiate presence



RACING!!!!!!



Racing Basics

- ECCC Road Season – March to May
 - 3-4 races a weekend
 - Road Race/Circuit Race
 - Criterium
 - ITT/TTT (ITT may be uphill)
 - 5 Categories (3 Women)
 - Something for everyone
- ECCC is the BEST conference in the country
 - Racing in the ECCC is FUN and it is a privilege

What Category to Race

- E (Intro) – No experience/not much training
- D – A little experience/some training
- C – Some Experience/in shape
- B – Experienced/training is needed
- A – Very Experience/Elite racer

What Category Cont.

- E – Not sure if you want to race
- D – don't feel like training, want to have lots of fun
- C – not sure if I want to train, but I want to have a little less fun
- B – had to ride a trainer, can be fun if you make it
- A – training since Nov./fun if you like pain

Racing Basics

- Never ride at the front
 - But someone has to...
- Be in the top 1/3
 - Closer to the front if the course is technical/difficult (sharp turns, hills, crosswinds, etc.)
- Follow wheels through turns
- Learn who to trust with their skills
- Sprint out of the saddle with your hands in the drops
- **KEEP YOUR HANDS ON THE BARS**

Types of Races– ITT/TTT

- Individual time trial
 - Can be flat, rolling, or uphill
 - You against the clock
 - No drafting!
 - 2-8 mi (short)
 - Generally don't need to eat/drink
- Team time trial
 - You and your teammates working together
 - Efficiency is critical
 - Must have 2 riders finish together in B and below categories, 3 in A's
 - RIDE TOGETHER, PRACTICE TOGETHER

criterium

- Many laps of a short course (0.5-1.5 mi)
- 15 (intro) to 60 (A's) min in length
- Varying terrain; climbs are usually short, but steep ("power climbs")
- Varying technicality— from ovals to Dartmouth's six turn crash-fest
- High speeds— requires good handling skills to conserve energy
 - Surges out of corners— stay near front to avoid "yo-yo effect" of accelerations
- Should drink, but you probably don't need to eat during crits

Circuit Races

- Fewer laps of a longer course (1.5-8 mi)
- 30 to 90 min in length
- Usually incorporate longer, but not absolutely decisive, climbs
- Less emphasis on cornering
- Need water, maybe food

Road Races

- Few laps of a long course (8-20 mi)
- 1h to 4h in length
- Longer climbs that split the field
 - Or crosswinds (Bucknell)
- May incorporate long, technical descents
 - 50+ mph speeds, proper form important
- Endurance and nutrition is very important here!