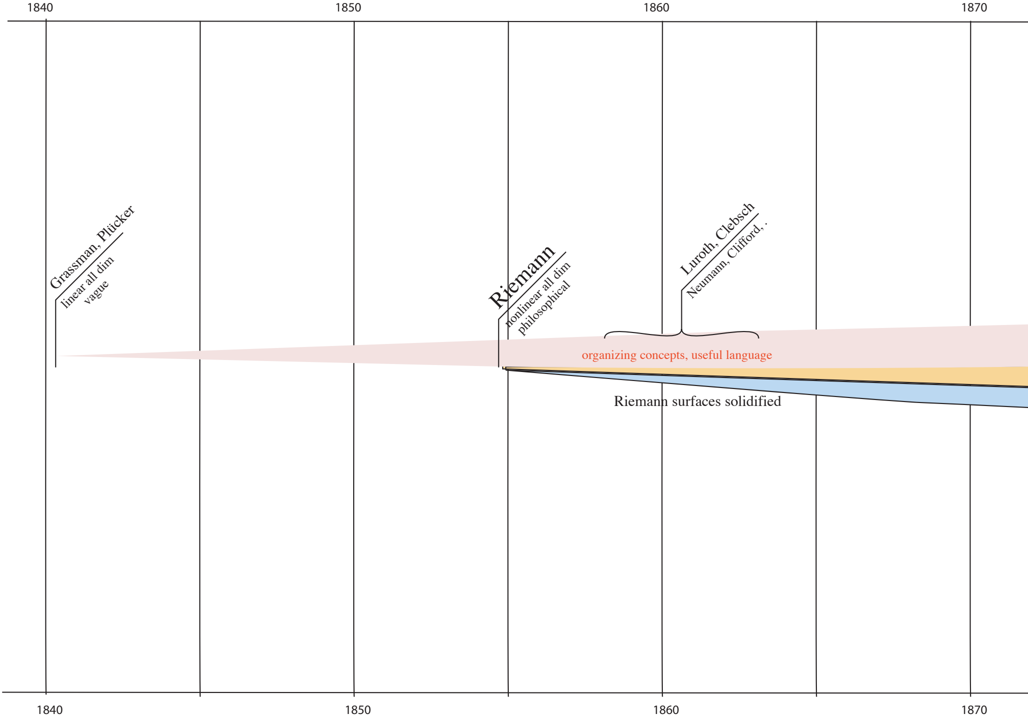
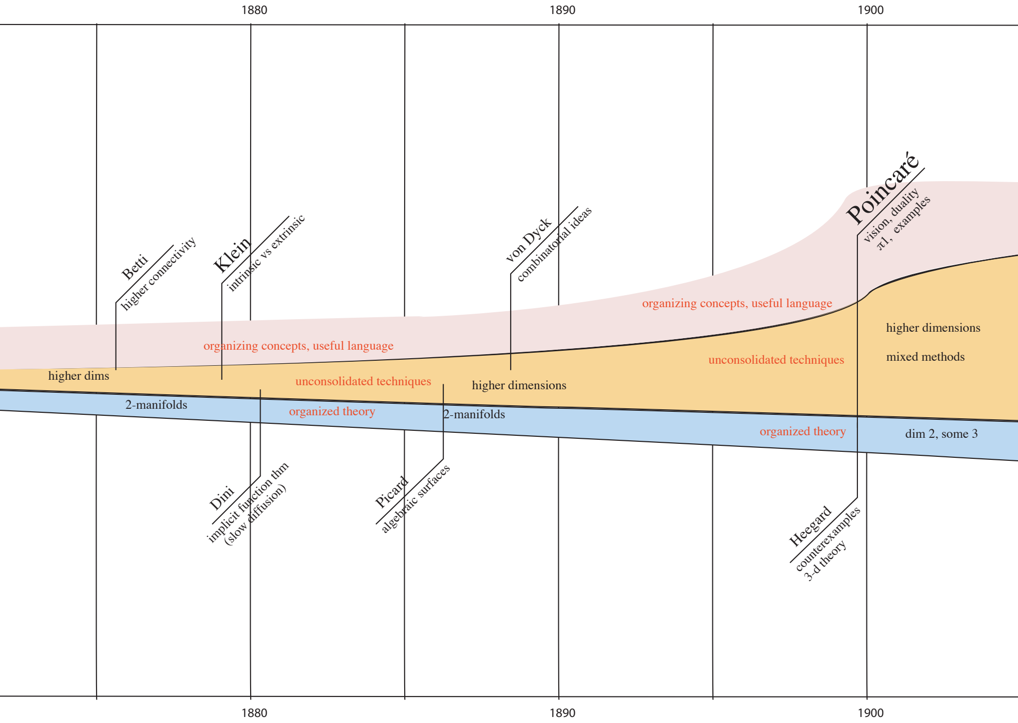
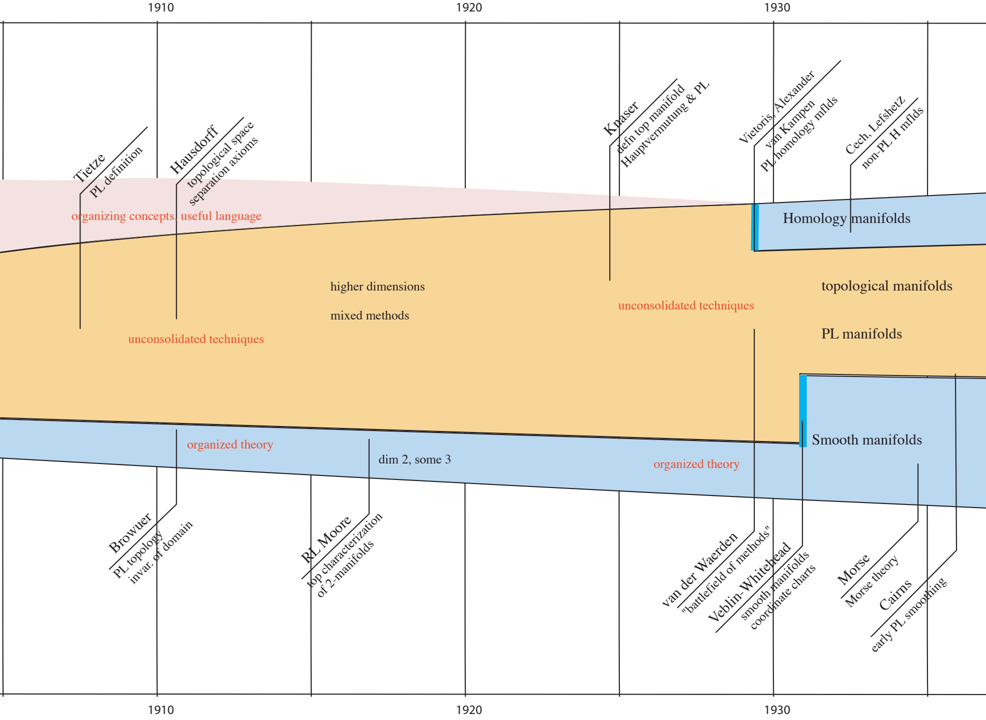
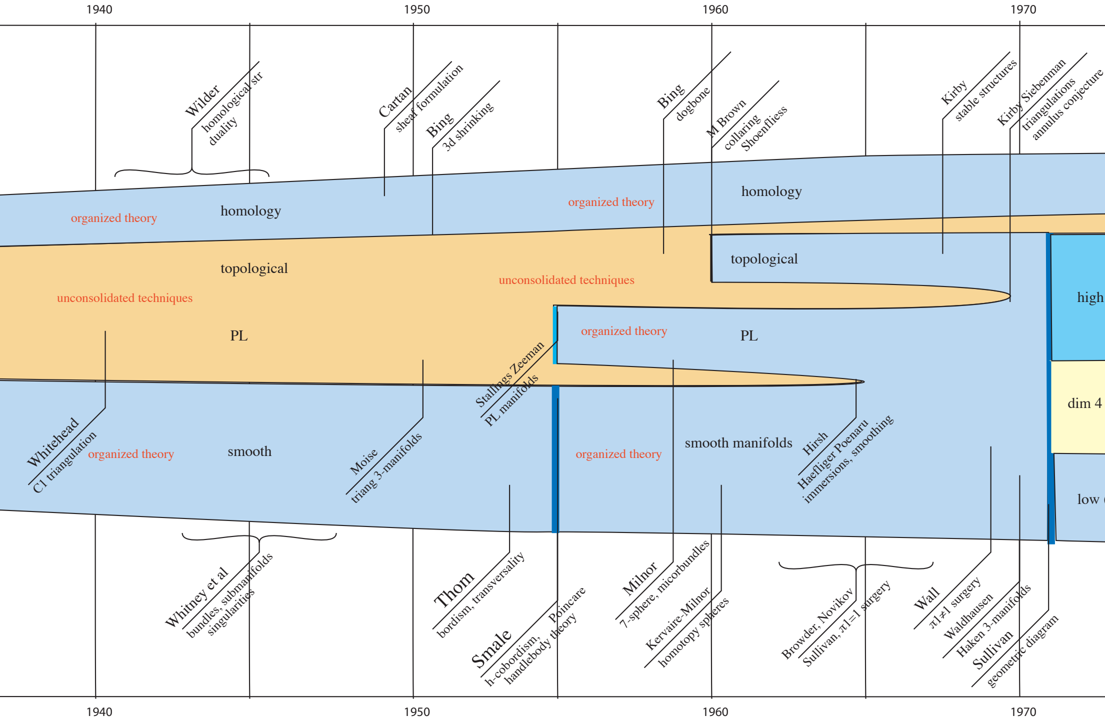
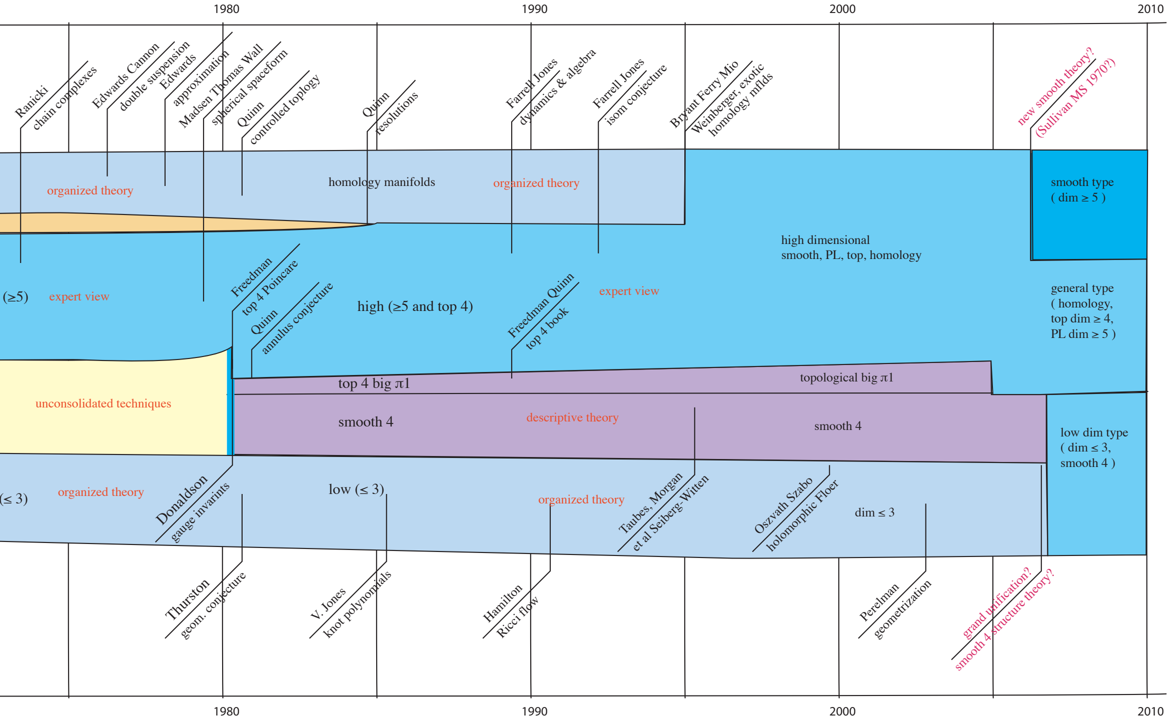

1840
1850
1860
1870
Grassman, Plücker
linear all dim
vague
Riemann
nonlinear all dim
philosophical
Luroth, Clebsch
Neumann, Clifford, . .
organizing concepts, useful language
Riemann surfaces solidified
1840
1850
1860
1870


1880
1890
1900
Betti
higher connectivity
Klein
intrinsic vs extrinsic
von Dyck
combinatorial ideas
Poincaré
vision, duality
π1, examples
organizing concepts, useful language
organizing concepts, useful language
higher dims
unconsolidated techniques
higher dimensions
unconsolidated techniques
higher dimensions
mixed methods
2-manifolds
organized theory
2-manifolds
organized theory
dim 2, some 3
Dini
implicit function thm
(slow diffusion)
Picard
algebraic surfaces
Heegard
counterexamples
3-d theory
1880
1890
1900


1910
1920
1930
Tietze
PL definition
Hausdorff
topological space
separation axioms
Kneser
defn top manifold
Hauptvermutung & PL
Vietoris, Alexander
van Kampen
PL homology mflds
Cech, LefshetZ
non-PL H mflds
organizing concepts, useful language
Homology manifolds
higher dimensions
mixed methods
unconsolidated techniques
topological manifolds
PL manifolds
unconsolidated techniques
organized theory
dim 2, some 3
organized theory
Smooth manifolds
Browuer
PL topology
invar. of domain
RL Moore
top characterization
of 2-manifolds
van der Waerden
"batlefield of methods"
Veblin-Whitehead
smooth manifolds
coordinate charts
Morse
Morse theory
Cairns
early PL smoothing
1910
1920
1930


1940
1950
1960
1970
Wilder
homological str
duality
Cartan
sheaf formulation
Bing
3d shrinking
Bing
dogbone
M Brown
collaring
Shoenfliess
Kirby
stable structures
Kirby Siebenman
triangulations
annulus conjecture
organized theory
homology
topological
unconsolidated techniques
PL
organized theory
homology
topological
unconsolidated techniques
organized theory
PL
high
dim 4
low
Whitehead
C1 triangulation
organized theory
smooth
Moise
triang 3-manifolds
Stallings Zeeman
PL manifolds
organized theory
smooth manifolds
Hirsh
Haefliger Poenaru
immersions, smoothing
Whitney et al
bundles, submanifolds
singularities
Thom
bordism, transversality
Smale
h-cobordism,
handlebody theory
Poincare
Milnor
7-sphere, micorbundles
Kervaire-Milnor
homotopy spheres
Browder, Novikov
Sullivan, $\pi 1=1$ surgery
Wall
$\pi 1 \neq 1$ surgery
Waldhausen
Haken 3-manifolds
Sullivan
geometric diagram
1940
1950
1960
1970


1980
1990
2000
2010
Ranicki
chain complexes
Edwards Cannon
double suspension
Edwards
approximation
Madsen Thomas Wall
spherical spaceform
Quinn
controlled toplogy
Quinn
resolutions
Farrell Jones
dynamics & algebra
Farrell Jones
isom conjecture
Bryant Ferry Mio
Weinberger, exotic
homology mflds
new smooth theory?
(Sullivan MS 1970?)
organized theory
homology manifolds
organized theory
smooth type
(dim ≥ 5)
high dimensional
smooth, PL, top, homology
(≥5)
expert view
Freedman
top 4 Poincare
Quinn
annulus conjecture
high (≥5 and top 4)
Freedman Quinn
top 4 book
expert view
general type
(homology,
top dim ≥ 4,
PL dim ≥ 5)
top 4 big π1
topological big π1
unconsolidated techniques
smooth 4
descriptive theory
smooth 4
low dim type
(dim ≤ 3,
smooth 4)
(≤ 3)
organized theory
Donaldson
gauge invarints
low (≤ 3)
organized theory
Taubes, Morgan
et al Seiberg-Witten
Oszvath Szabo
holomorphic Floer
dim ≤ 3
Thurston
geom. conjecture
V. Jones
knot polynomials
Hamilton
Ricci flow
Perelman
geometrization
grand unification?
smooth 4 structure theory?
1980
1990
2000
2010